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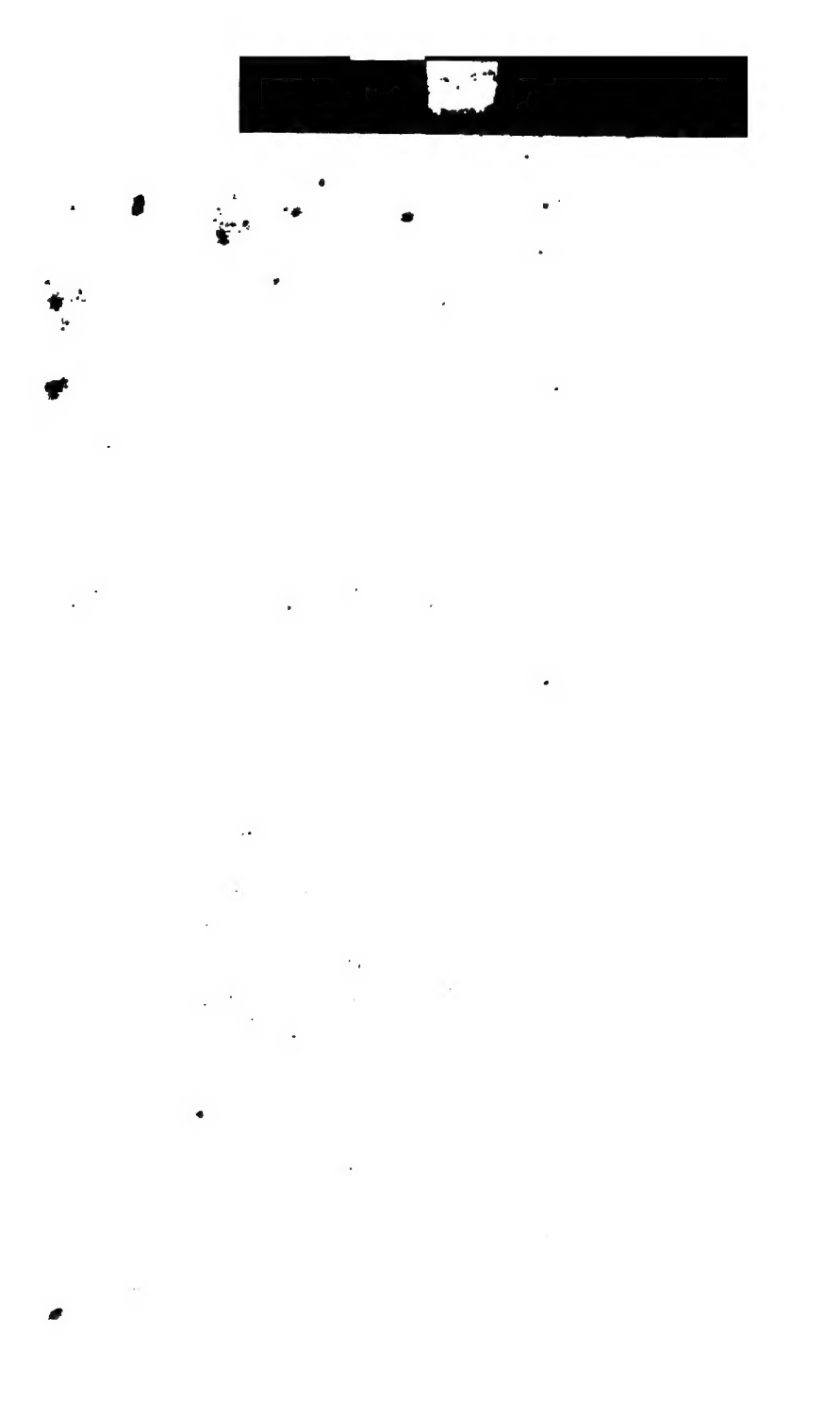
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PATENTS FOR INVENTIONS.

ABRIDGMENTS

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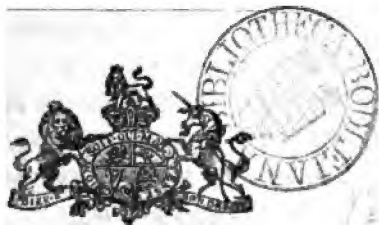
Specifications

RELATING TO

CARRIAGES AND OTHER VEHICLES  
FOR RAILWAYS.

A.D. 1807-1866.

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## P R E F A C E.

THE Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct inventions, and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering, therefore, the large number of inventions and applications of inventions to be separately dealt with, it cannot be doubted that several properly belonging to the group which forms the subject of this

volume have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in second or supplemental editions.

This volume contains Abridgments of Specifications to the end of the year 1866. From that date the Abridgments have not been published in classes, but will be found in chronological order in the quarterly volumes of the "Chronological and Descriptive Index" (*see* List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

The present series of Abridgments embraces all inventions relating to the construction of railway carriages for the conveyance of passengers, waggons and trucks for the carriage of merchandise on railways, the tenders of locomotive engines, and vehicles with flanged wheels intended to travel on tramways or street railways. Thus all inventions are noticed which relate to the bodies, framing, springs, axles, wheels, brakes, buffers, and other details of such carriages and other vehicles; and also to contrivances for preventing accidents by arrangements of apparatus which may be connected with such vehicles, or with the engine of a train, and be acted upon by other apparatus placed on or

## PREFACE.

near a line of railway, so as to bring the brakes into action in order to stop the progress of the train when desirable. As regards railway engines all inventions are noticed which relate to the framework, springs, buffers, brakes, axles, and wheels of such engines, as also apparatus for removing obstructions from the rails, and otherwise preventing accidents; but the details of the engines themselves are not noticed here, as they are included in the series of Abridgments relating to the "Steam Engine." In fact, the propulsion of carriages or waggons does not form a part of the present subject, nor yet the aiding of the motion of engines or carriages by means of screws, racks and wheels, or other contrivances by which their ascent of inclines is facilitated. Neither does this series include arrangements for lifting or otherwise transferring engines or carriages from one line of rails to another, although it does include arrangements for enabling engines and carriages to travel upon lines of rails of different gauge; nor does it include arrangements for the warming, lighting, or ventilating of railway vehicles, unless the invention described involves some important point relating to the construction of such vehicles.

It must also be observed that various inventions have been patented which relate in some degree to the construction of railway vehicles, but not sufficiently so to entitle them to a place in this work. These embrace improvements in the treatment of metals, the production of artificial leather and cloth (suitable among other purposes for the lining of carriages), and other matters, which are more properly classed under the heads to which they immediately belong,

and will be found in the volumes of Abridgments containing such classes of subjects.

Inventions relating to carriages for atmospheric railways are likewise not included in this series, except in cases in which the invention, or some part thereof, appears to be applicable not only to such carriages but also to those for ordinary railways ; nor does the present work embrace such carriages as run upon portable or endless rails connected thereto.

The Abridgments marked thus (\*\*) in the following pages were prepared for another series or class, and have been transferred therefrom to this volume.

B. WOODCROFT.

*May, 1871.*



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## INTRODUCTION.

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Modern science has provided us with many sources of comfort and convenience, and to these nothing has conduced in a greater degree than the establishment of our present system of travelling by Railway.

To give even an outline of all the various contrivances which have been suggested, and in many cases adopted, with reference to the construction of Railway engines and carriages, would far exceed the limits of this part of the present work. The framing, the springs, the axles, the wheels, the breaks, the buffers, and all the other multitudinous details of such engines and carriages have attracted for some years the attention of the mechanical world, and, as an inspection of the body of this work will show, have called forth the exercise of much skill and ingenuity.

It is probably, however, to be regretted that those engaged in the construction of our railway carriages and engines have not been led to agree upon some more definite system than has hitherto prevailed among them. Mr. Daniel Kinnear Clark, C.E., in his work on "Railway Machinery," remarks, with reference to the variations of practice which exists in the construction of engines, that probably five distinct classes of locomotive would afford a variety sufficiently accommodating to suit the most varied traffic of railways, whereas he should suppose the varieties of locomotive in actual operation in this country and elsewhere are more nearly five hundred in number. And as regards the construction of carriages Mr. Clark says, "the practice of carriage builders is pervaded by a spirit of routine which obstructs the course of improvement, and yet, in their essential details, carriages are referable to very simple mechanical combinations. The same may be said in some degree of waggons. In all rolling stock simplicity, lightness, and strength should be combined; whereas some waggon builders, to insure mere brute strength, throw in materials with an entire disregard to the dead weight of the vehicles,

"unmindful of the aphorism that though a vehicle cannot be too strong it may be too heavy."

With regard to the framing of railway vehicles many diversities of opinion have existed, and many different contrivances have been suggested. In the early locomotives no framing, properly speaking, was used. The boiler was in fact the foundation of the engine, the cylinders being in some cases partly enclosed within, and in other cases fixed outside it, the axle bearings, and other parts of the machine being attached to it in such modes as fancy or the exigencies of the case might direct. The disadvantages of this system, however, speedily became apparent. Cylindrical surfaces, though strong, are not suitable for attachments, and this led to the adoption of a frame which should sustain both the engine and the boiler itself. This change, like others, was not effected without difficulty. Some engineers adopted a frame inside the wheels, others placed the wheels inside the frame. Bury was the great advocate of the former, and Sharp of the latter system. In speaking of Sharp's arrangement, Mr. Clark says:—"He threw out wings from the front and back plates of the smoke box, which rested on and were rivetted to the frame, and inserted filling-up plates between and rivetted to the smoke-box, frame, and wings, so as to forbid any play in that quarter; he bound the fire-box to the frame by similar wings consisting of plates on edge, of great strength, flanged and rivetted, and by an extensive foot-plate and lower draw-plate rivetted with lines of angle iron to the frame, and the back and sides of the fire-box. The boiler being thus wedged into the frame, and being further bound together by four inside stay plates between the fire-box and smoke-box, it was reasonably expected that nothing could give way, and in truth it is to this almost invincible elaboration of framework that Sharp's engines are known over the world as the most durable of outside-framed engines, as Bury's have been unquestionably the most durable of engines with inside frames."

The axles of railway vehicles are obviously of great importance, and to these parts much attention has been directed. In the year 1826 Mr. Robert Stephenson obtained a patent for an invention the object of which was to prevent the extra friction produced by the wheels of such vehicles when passing round curves in the rails. Instead of fixing each pair of wheels upon a single axle, as usual, Mr. Stephenson proposed that each wheel

should have a separate axle working in separate bearings, each wheel being thus at liberty to revolve independently of and at a different velocity to the other. And in order to obviate the danger which arises from a wheel passing over a sunken portion of rail, Mr. Stephenson arranged the bearing of each axle next to the wheel in such manner that instead of working in a circular aperture it works in a vertical slot; this arrangement allowing that end of the axle and the wheel to descend in passing over such a sunken part of rail, the wheel thus following and being kept upon the rail; the descent of the axle and wheel being facilitated by the opposite end of the axle being formed into a ball and working in a spherical bearing; this part of the arrangement constituting in fact a ball and socket joint. Many other arrangements having similar objects have since been suggested, in some cases each wheel having a separate short axle, while in other cases a single axle was employed upon which one or both of the wheels worked loosely. None of these contrivances, however, appear to have been attended with sufficient advantage to lead to their general adoption.

A number of axles were employed on the London and Birmingham Railway some years ago which were each formed in one length, and for the reception of one pair of wheels. The nave of each wheel was placed upon a part of the axle which was turned down so as to form a shoulder against which the wheel rested, the journals of the axle, outside the wheels, being of smaller diameter still. It was found that many of these axles failed in practice, the axle generally giving way behind one of the wheels, or at the shoulder. From this it appeared that the formation of such shoulders was objectionable, but instead of abolishing the shoulder the arrangement was modified by bevelling the shoulder to an angle of  $45^{\circ}$ , and this was found an advantageous modification. Mr. Henson, the talented and energetic waggon superintendent of the railway, however, had an axle made in which the shoulder was virtually removed, the axle being only  $\frac{1}{4}$ th of an inch thicker behind the nave of the wheel than inside it, and this increase of diameter being gradually gained through a slope of half an inch in length; this axle was found to succeed remarkably well. In forming the journals of axles different arrangements have been adopted, among which may be mentioned the "double cone" journal of Brunel, but the cylindrical form of journal has proved superior to any other, and is that now generally adopted.

Upon the wheels of railway vehicles an immense amount of attention has been bestowed, and various are the forms in which cast and wrought iron, steel, wood, and other materials have been combined in their construction. The first patent relating to this branch of railway machinery was granted to George Hawks, in the year 1807, the invention for which that patent was granted consisting in forming a cast iron wheel by casting two or more suitably formed parts, which are afterwards joined together by screws or rivets so as to constitute a complete wheel; this mode of forming a wheel being free from the objection arising from the liability of a wheel, when cast in one entire piece, to become fractured by the irregular contraction of the arms and rims during the cooling of the metal. Another of the early inventions relating to this subject was that of Thomas Rogers, for which he obtained a patent in the year 1812; in this case the nave of the wheel being composed of cast metal, the spokes of malleable metal, and the rim of either cast or malleable metal, or of a combination of both; a rim of malleable iron being, if desired, surrounded by a rim of cast iron. These inventions were rapidly succeeded by others, embracing wheels both with and without spokes; in some cases discs of wood forming the main portion of the inner part of the wheel, while in other cases double spokes of metal had blocks of wood placed between them; in other cases, again, the wheel being formed from a single piece of wrought iron, brought to the requisite shape by means of dies. Much attention has also been directed to the tyres of wheels, many inventions relating to which have formed the subjects of patents. Among these may be mentioned the invention of Mr. W. H. James, for which he obtained a patent in the year 1825, and according to which the tyre or periphery of the wheel is made of different diameters, being thus formed into what the patentee says may be called "steps;" the object of this being to enable carriages provided with such wheels to pass round curves in the rails with facility; the rails at such curves being of different heights and at different distances asunder, so as to bring into action portions of the wheels of different diameters on opposite sides of the carriage. Mr. Clark, in the work which has been already alluded to, gives the results of a number of experiments which were made with differently constructed wheels on the London and North Western and other railways. These embraced various forms of cast iron wheels with straight spokes, and these were found to be unsafe at high speeds and in frosty



weather. Other wheels were tried, in which the spokes were of wrought iron, curved into different figures, and in these it was found that the resistance to the shrinkage of the tyre and to alterations in the form of wheel by concussions on the rails was insufficient. In wheels, such as Haddan's, in which segments of wood were inserted between double spokes of iron, the segments were liable to shrink, become loose, and drop out. In Wharton's "cheese wheel," which was composed of circular wooden blocks placed around a cast iron nave, and extending from that to the inner side of the rim, the parts being tightened up by wedges, it was found that the wheel contained too many pieces to be easily kept in order, while Smith's solid wrought iron disc wheel was found, on the other hand, to be too rigid and inflexible, leading the "tread" to wear out more rapidly than that of an ordinary wheel. A wooden disc wheel, by Mansell, was found to work very well, but to involve a large amount of expensive workmanship in its construction. The results of these experiments were considered to show:—

That the body of the wheel should be independent of the tyre as regards its form and strength, so as to remain unalterable under all conditions of the tyre:

That for this object the spokes of spoke wheels should be sufficiently numerous to maintain the rim inflexible—say eight spokes for a 3 feet wheel, landing upon the rim at about 2 inch intervals:

That disc wheels are preferable to spoke wheels, as they may be more simply made, and afford a continuous bearing to the tyre:

That the tyre, or wearing part, should be quite distinct from the body of the wheel, so as to be readily renewable; but secured to it continuously, and not at wide intervals:

That the tyre should, so far as practicable, be made a rigid ring, and should preserve its form even after it is well worn:

That the body of the wheel should have some amount of elasticity, to cushion the blows radially, and to resist from lateral concussions.

The bearing springs of railway vehicles have likewise formed the subject of many inventions. Many attempts have been made to supersede the metallic bearing spring by the employment of piston working in cylinders filled with steam or compressed air, of which the earliest example is the invention of Losh and

Stephenson, for which a patent was granted to them in the year 1816. Discs of india-rubber, corrugated plates of metal, and helical and spiral coils of metal, have also been proposed for use as bearing springs, but none of the contrivances suggested have proved to be in practice superior to the well known arrangement in which the spring is composed of a number of metallic plates of different lengths laid one upon another. A bearing spring which has been used with advantage for a first-class passenger carriage was composed of nine steel plates, each three inches broad, the two outer plates being  $\frac{3}{4}$ ths and the inner plates  $\frac{5}{8}$ ths of an inch thick, a tension plate of wrought iron,  $\frac{1}{2}$  an inch thick, being placed upon the back plate, the tension plate having eyes formed at the ends, by which they are jointed to the suspending links. This spring, when weighted, was 5 feet 3 inches long, the tension plate 5 feet 6 inches to the centres, and the scroll irons, or brackets of the suspending links, 6 feet apart at the centres. For second and third-class carriages a larger number of plates were used. Waggon springs have been much varied, but it has been found that a flexibility of one inch per ton of load was the most suitable. In the case of buffer and draw springs, helical and spiral coils of metal have, however, been used with advantage, as well as springs composed of circular discs of india-rubber placed upon the buffing and draw rods.

The breaks of railway vehicles form such important auxiliaries in preventing those deplorable accidents which arise when control over the motion of a train by other means has been lost, that more than ordinary attention has been devoted to this element of railway machinery. Blocks to be pressed against and sledges to be passed under the wheels; cylinders filled with liquid in which pistons were to be worked to and fro; the resistance of the air, and the action of magnetic attraction, have all been enlisted into the service with varying success, but few of the multitude of contrivances put forward with reference to breaks have proved of any practical utility. Some railway engineers have preferred the sledge, and others the blocks. The latter act of course by retarding the revolutions of the wheels, and this has the effect of causing a grinding action to take place between the wheels and the rails so long as the momentum of the train continues, the result being the formation of flat places on the outside of the wheel tyres. The sledge is free from this objection, but is liable to one much greater—the sudden introduction of a sledge

between the wheel and the rail tending to throw the wheel off the rail altogether, and so increase the danger it was meant to avert. Notwithstanding the objection attending the use of blocks, therefore, they constitute the form of break generally used; but it is probable that this element of our railway machinery will yet receive much improvement.

Upon the bodies of railway vehicles great attention has been bestowed, and combinations of wood, metal, leather, and other substances, in various forms, have been suggested with the view of producing light, strong, elegant, and convenient carriages for passengers, while for waggons and trucks wood and iron have been the materials preferred. For the under frames of carriages English oak has been found to be the best material, as well as for the pillars of carriages, and the under and upper frames of waggons. Ash has been found a good material for the construction of carriage bodies and roof ribs, and deal for that of the lining, roofing, and flooring of both carriages and waggons. In the internal arrangement of passenger carriages great diversity exists, the most usual arrangement being that in which the seats are placed across the carriage, the passengers of each compartment or division thus being in two lines facing each other. It has been contended by some, however, that an arrangement in which the seats should be placed lengthwise of the carriage and the passengers sit in two or more long lines, shoulder to shoulder, as in an omnibus, would be a safer arrangement in case of collision, as the passengers would be less liable to damage from being thrown against each other than under the ordinary arrangement. There is doubtless truth in this, but it is probable that the majority of passengers, in this country at least, will continue to prefer the present ordinary arrangement on account of the superior privacy it affords. The use of iron plates, rivetted together, has been suggested in the construction of the bodies of passenger carriages; and if a carriage formed of that material could be built of such strength as not to collapse in case of a collision without being at the same time too heavy, such a carriage would be preferable to those in common use; but, as has been well observed by Mr. Clark, if such a carriage did collapse, the passengers would be crushed within it and the unrivetting of the parts of the carriage in order to extricate them would be a fearful process. Thin corrugated iron has, however, been used for the panelling of carriages, and has been found to answer the purpose well. And on the Great

Western Railway carriage bodies, of the third-class have been used which were formed of sheet iron, No. 11 wire guage, framed with angle iron.

In the construction of the bodies of waggons both wood and corrugated sheet iron have been used, but in the construction of waggons and trucks much depends upon the particular circumstances under which they are to be used ; and in their formation, as well as that of carriages, much diversity of practice will doubtless continue to prevail.

These observations may now be concluded by the following extract from Mr. Smiles' preface to his life of George Stephenson :—

“ What may be the eventual results of the general adoption of  
“ railways in the civilised countries of Europe remains to be seen ;  
“ but it is probable that, abridging distance, bringing nations  
“ into closer communication, and enabling them more freely to  
“ exchange the products of their industry, they may tend to  
“ abate national antipathies, and bind together more closely the  
“ great families of mankind.

“ Disastrous though railway enterprises and speculations have  
“ proved to many concerned in them, and mixed up though they  
“ have been with much fraud and folly, the debt which the public  
“ at large owe to railways cannot be disputed ; and, after all  
“ temporary faults and blots have been disposed of, they must  
“ nevertheless be recognised as the most magnificent system of  
“ inter-communication that has yet been given to the world.”

**CARRIAGES AND OTHER VEHICLES  
FOR RAILWAYS.**



THE UNIVERSITY OF CHICAGO  
PRESS



## CARRIAGES AND OTHER VEHICLES FOR RAILWAYS.

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A.D. 1807, November 6.—N° 3079.

**HAWKS, GEORGE.**—"A method of making and likewise of  
"keeping in repair cast-iron wheels for coal waggons and other  
"carriages where such wheels are applicable."

Before describing this invention the patentee states that wheels for coal waggons and other carriages of that class have usually been formed by casting "their arms and rims in one entire piece," this causing them to be "partially weakened by the irregular contracting of the arms and rims in cooling," leading to fracture from trifling shocks or jerks, and the wheel becoming useless when the rim is worn out or broken. He then states that he avoids these defects "by making or casting the wheel in two or "more parts," and joining such parts by screws, rivets, or other suitable means, facility being thus afforded for replacing any part or parts which may become unserviceable, and the evils arising from irregular contraction being obviated.

The Specification is accompanied by a drawing which represents a wheel "calculated for the general class of Newcastle coal "waggons," the wheel having a flanged tyre, and being obviously meant for railway purposes. The details of such wheels may, however, be varied.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 12 (*second series*), p. 398; and Rolls Chapel Reports, 7th Report, p. 179.]

A.D. 1812, November 28.—N° 3618.

**ROGERS, THOMAS.**—"An improved method of constructing  
"wheels for all sorts of carriages."

In this invention the naves of the wheels are formed of cast iron or other suitable cast metal or metallic compound, and the

spokes of the wheels of malleable metal, the rim or circular part of either malleable or cast metal. The spokes are of the usual form, or of any other form that may be desired, and may be jagged at the outer and inner ends, or otherwise indented, upset, or made rough at such ends, for the purpose of securely fixing them in the nave and rim when such nave and rim are cast upon them. Or the outer ends of such spokes may be secured to a ring of malleable iron by inserting them into holes in the latter, and rivetting them or otherwise. Such a ring of malleable iron, having the spokes connected therewith, may then have a rim of cast metal run thereon, or the rim may be cast without the malleable ring, and then "shod" in the ordinary manner. When a ring of malleable iron is used, the surface thereof, as well as the ends of the spokes, may be cleansed by the use of the mixture of oil of vitriol and water called pickle, or by other means, and then covered with a solution of borax or other flux capable of promoting the union or adhesion of the cast metal thereto, being, moreover, heated if desirable before such cast metal is run thereon. In proceeding to form a wheel the rim is first produced by running the cast metal upon the outer ends of the spokes, or upon a malleable iron ring connected to them as mentioned above, this being performed in a suitable mould, and the rim being allowed to cool either partially or wholly before the nave is cast upon the inner ends of the spokes, this arrangement preventing the injurious effects which would arise if the rim and nave were cast together, from the contraction of the former in such cooling. The nave may be cast solid, or with a perforation, which may afterwards be enlarged by suitable means.

Although the patentee does not mention wheels thus formed as being specially applicable for railway purposes, the manner in which the invention is described would seem to indicate that such wheels are meant to be used for such purposes, for which reason the invention is noticed here.

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 23 (second series), p. 69; and Rolls Chapel Reports, 5th Report, p. 93.]

A.D. 1815, November 14.—N<sup>o</sup> 3959.

DE BAADER, JOSEPH.—"An improved plan of constructing  
"railroads, and carriages to be used on such improved railroads,  
"for the more easy, convenient, and expeditious conveyance of



"all sorts of goods, wares, merchandise, persons, and all other articles usually or at any time removed in carriages of any construction whatever."

That part of this invention which relates to the construction of carriages is thus set forth :—

"The carriages which are to be used on my said improved railroads, and the size, shape, and body of which may be varied according to the quantity and nature of the articles to be transported, or according to the convenience or taste of the persons which have to be conveyed, are provided each with four vertical wheels if the line of the rails be double, or with two wheels, one placed behind the other, if there is but a single line of rails. These wheels have a projecting rim or flanch to keep them upon the rails, but every carriage is provided with two or four horizontal or inclined wheels (constructed of iron, brass, or any other fit substance) placed on both sides of the carriage, or in the middle line of the same, turning round their vertical or inclined axles, and working against the aforementioned lateral rails on the outer side, or in the middle between the two upper rails, and below their projecting horizontal plates," the patentee stating that by this arrangement "the lateral dragging friction of the wheels, which upon common tram or railroads is very considerable, is totally avoided," and that the carriages "are kept in such a steady position that they can neither overset nor get off the railway." He also states, that in order to facilitate still more the movement of the carriages, diminish the friction, and prevent the heating of the axles and boxes, he sometimes causes "the axletrees of the principal or vertical wheels, duly turned and polished, to move between or beneath friction wheels or rollers," and that he claims as a part of his improvements, "the application of such friction wheels or rollers to railway carriages, for which they have hitherto never been employed."

[Printed, 4d. No Drawings. See Rolls Chapel Reports, 8th Report, p. 111.]

A.D. 1816, September 30.—N<sup>o</sup> 4067.

LOSH, WILLIAM, and STEPHENSON, GEORGE.—"A method or methods of facilitating the conveyance of carriages and all manner of goods and materials along railways and tramways, by certain inventions and improvements in the construction of

" the machine, carriages, carriage wheels, railways, and tramways  
" for that purpose."

One part of this invention relates to " sustaining the weight,  
" or a proportion of the weight," of a locomotive engine, " upon  
" pistons moveable within cylinders, into which steam or the  
" water of the boiler is allowed to enter in order to press upon  
" such pistons, and which pistons are, by the intervention of  
" certain levers and connecting rods, or by any other effective  
" contrivance, made to bear upon the axles of the wheels of the  
" carriage upon which the engine rests," the patentees stating that  
by this arrangement the engine is preserved from shocks and  
vibration " with much more accuracy than could be obtained by  
" employing the finest springs of steel to suspend " such engine.

Another part of the invention relates to the wheels of carriages  
and waggons meant to travel on railways, and consists in forming  
such wheels either with spokes of malleable iron and cast-iron  
rims, or with spokes and rims of cast iron surrounded by hoops,  
tires, or " trods " of malleable iron, the patentees stating that in  
some instances, " particularly for wheels of very small diameters,"  
they use plates instead of spokes of malleable iron, " to form the  
" junction between the naves and the cast-iron rims of the  
" wheels."

One mode of carrying out this part of the invention is described  
in which a nave of cast iron is provided with wrought-iron spokes  
or arms, the inner ends of which are inserted into the nave when  
cast, the outer ends being afterwards inserted into openings in a  
rim of cast iron, these openings being of dovetail form, and the  
outer ends of the spokes of corresponding shape. The spokes  
are made red hot before their insertion into the openings in the  
rim, the contraction of the spokes in cooling causing their dove-  
tailed ends to become firmly wedged in such openings, and the  
spokes being thus prevented from afterwards working loose, being  
also further secured by keys.

Another arrangement is described, in which a wheel composed  
of a rim and arms or spokes of cast iron is surrounded by a malle-  
able iron tire, the spokes being curved, and the rim being pro-  
vided with a slit or aperture, into which a key is inserted. " The  
" reason of this is, that on the application of the hot tire the cast  
" metal expands unequally, and the rim is liable to be cracked  
" and the arms drawn off unless the first is previously slit or  
" opened, and the latter curved, which allows them to accommo-

“date themselves to the increased diameter of the wheel. By this formation of the wheel the tire might be forced on when cold, and keyed up afterwards.” In another case the cast metal rim is dovetailed, “so that when the tire, which is dovetailed to suit it, is put on hot, it contracts and applies itself to the rim with a degree of adhesion which prevents its coming off from the motion of the wheel on the railway.”

A “rolley or tram wheel” is described as being composed of wrought-iron arms projecting from a cast-iron nave, and connected to a rim by being bolted to projections inside the latter; and another “rolley or tram wheel” is described as being composed of a circular plate upon which both nave and rim are cast, the edges of the plate being “previously covered with a thin coating of loam and charcoal dust or other fit substance, to prevent the too intimate adhesion between the iron plate and metal rim, so that if the rim should break it can easily be taken off and replaced by casting another on the plate.”

[Printed, 1821. Drawing. See Repertory of Arts, vol. 30 (*second series*), p. 321; Register of Arts and Sciences, vol. 4, p. 446; Engineers and Architects' Journal, vol. 10, p. 113; Engineers and Mechanics' Encyclopædia, vol. 2, p. 402; and Webster's Reports, vol. 1, pp. 199 and 200.]

A.D. 1821, November 22.—No 4618.

PALMER, HENRY ROBINSON.—“An improvement or improvements in the construction of railways or tramroads, and of the carriage or carriages to be used thereon.”

One part of this invention consists in the construction of carriages capable of travelling upon a single elevated rail. “These carriages have each two receptacles for the load to be carried in, viz., one receptacle on each side of such elevated rail, and the carriages are so constructed as that the common centre of gravity thereof, whether loaded or empty, shall be below the upper surface of the rail.” “The wheels, which are of cast iron, are placed one before the other, the only peculiarity to adapt them to the improvement being in the form of the rims, which should correspond with the form of the plates on the rail over which they are to pass, namely, if the surface of the plates be flat the rims of the wheels should be cylindrical, if the surface of the plates be curved or of any other shape the rims of the wheels should be so shaped as to coincide with it.”

“The form of the wheels may be according to the judgment of the maker of them, but it is necessary they should be secured

"from getting off the rail, either by the shape of the rims being concave for a convex plate, or being convex for a concave plate, or being cylindrical, with flanches on each side, projecting over the sides of the plates if such plates be flat."

The axles of the wheels extend so far on each side as to allow of the receptacles being suspended therefrom, and in order to prevent the axles from being bent by the weight of the load in the receptacles a bent iron bar is placed over each wheel, with its ends connected to the axle near to the wheel, this bent bar serving as a fulcrum for an iron strap or brace, which passes over it and has its ends also connected to the axle at some distance from the wheel. The receptacles themselves may be composed of iron plates rivetted together, or of wood or other material, one end of each being so arranged as to open and close in the manner of a door, for the more easy reception and discharge of cargo, being retained in position when closed by suitable latches, and the receptacles are suspended from the axles of the wheels by rods which are hooked at the lower ends so as to enter loops attached to the receptacles, the axles being themselves connected by parallel and diagonal rods, which maintain them in due position.

[Printed, 1s. Drawing. See Repertory of Arts, vol. 1 (*third series*), p. 129; London Journal (*Newton's*), vol. 5, p. 57, and vol. 10, p. 32; Mechanics' Magazine, vol. 27, p. 394; Register of Arts and Sciences, vol. 1, pp. 97 and 113, vol. 2, pp. 150 and 353, vol. 3, p. 141, vol. 4, p. 219, also vol. 1 (*new series*), p. 9, and vol. 4 (*new series*), p. 25; Engineers and Mechanics' Encyclopedia, vol. 1, p. 616, also vol. 2, p. 425.]

A.D. 1821, December 20.—No 4630.

GRIFFITH, JULIUS.—(*Partly a communication.*)—"Certain improvements in steam carriages, and which steam carriages are capable of transporting merchandize of all kinds, as well as passengers, upon common roads, without the aid of horses."

One part only of this invention requires notice here, this consisting in a mode of supporting the engine and boiler of a locomotive by chains combined with springs. The whole machine is sustained by a framework of wood, suitably mounted on wheels, and to one part of this wooden framework is firmly bolted iron framework, composed of horizontal, diagonal, and other bars, one portion of this framing projecting horizontally on each side of the engine and boiler, and there being suspended from each of these projecting portions two chain slings having a helical spring placed

horizontally between them, these chains sustaining the engine and boiler. The two chains are in each case connected at the upper and lower ends to the same ring or link, but are kept some distance apart about midway of their length by the springs, the latter thus obviating the injurious effect upon the engine and boiler which would arise from shocks or jolts if the chains were rigid.

Although this arrangement is described more particularly with reference to locomotives for ordinary roads, it is noticed here on account of its obvious applicability to locomotive engines and boilers in general.

[Printed, 1s. 10d. Drawings. See London Journal (*Newton's*), vol. 5, p. 169; Register of Arts and Sciences, vol. 3 (*new series*), p. 131; *Mechanics' Magazine*, vol. 18, p. 287; *Engineers and Mechanics' Encyclopedia*, vol. 2, p. 447.]

A.D. 1824, February 19.—N° 4905.

VALLANCE, JOHN.—“A method of communication or means of intercourse by which persons may be conveyed, goods transported, or intelligence communicated from one place to another with greater expedition than by means of steam carriages, steam or other vessels, or carriages drawn by animals.”

This invention relates chiefly to atmospheric railways and carriages adapted thereto, but there is one part of the invention relating to the latter which, as it might be applied to the engines and carriages of railways in general, it has been thought desirable to notice here. This consists in the application of pistons, the rods of which point downwards and are connected to the axle or axles of the carriage, the pistons being placed in inverted cylinders which are secured to a convenient part of the framing of the carriage. The latter is also provided with a condensing air pump, which may be placed and arranged as most convenient, and from this pump proceed pipes for the supply of condensed air to the inverted cylinders, such air being forced into the cylinders between the upper ends of the latter and the upper sides of the pistons, this air, by its elasticity serving in place of springs to the body of the carriage, and preventing any injurious effect arising from jolts or concussions. The patentee states that such air “executes the purpose it is intended for with a precision that no other method of obviating or diminishing concussion will approach

"to," and that "it is but increasing the condensation" in order to "render springs which at one time are exactly adapted to a load of one ton in the next minute adapted to a load of ten tons, and so on in greater or less proportion." He also mentions a mode of driving the air pump by means of gearing receiving motion from an axis of the vehicle, the apparatus in this case being provided with a safety valve, "loaded to the degree of condensation required," and states that "condensed air confined in a cylinder or cylinders by a piston or pistons has not before been used to diminish the concussion or soften the motion of vehicles."

The invention includes a mode of conveying telegraphic information.

[Printed, 1s. 6d. Drawing. See Repertory of Arts, vol. 1 (*third series*), p. 52; London Journal (*Newton's*), vol. 10, p. 113, and vol. 12, p. 151; *Mechanics' Magazine*, vol. 6, pp. 338 and 426, vol. 7, pp. 15, 36, 51, 167, 194, 251, 307, 367, 377, and 412, also vol. 8, pp. 11, 35, and 68; Register of Arts and Sciences, vol. 1, pp. 281 and 292, vol. 2, p. 325, also vol. 4, p. 327; *Engineers and Mechanics' Encyclopedia*, vol. 1, p. 35.]

A.D. 1824, December 18.—N<sup>o</sup> 5060.

SNOWDEN, WILLIAM FRANCIS.—"A wheelway and its carriage or carriages, for the conveyance of passengers, merchandize, and other things along roads, rail, and other ways, either on a level or inclined plane, and applicable to other purposes."

One part of this invention relates to a mode of constructing the wheels of railway and other carriages, in which the rim or circular part is formed by placing a series of blocks or pieces of wood side by side, and attaching them together "so that the grain of the wood shall radiate from the centre to every part of the periphery. The pieces of wood thus disposed are to be bound together by two rings of iron, placed on the sides of the circular rim of the wheel, instead of the ordinary tire or tyre iron," the patentee stating that by this contrivance the "ends" of the wood will run upon the surface over which the wheel may travel, and that the wheel "will be much stronger and enduring than when made of bent timber."

According to another part of the invention carriages containing "ponderous bodies" are caused to move on wheels or rollers which run in grooves formed in the sides of a trunk over which the carriages pass, there being arranged within the trunk a series of toothed wheels, in gear with which are racks connected to the

carriages, the latter being propelled by the wheels being caused to rotate.

[Printed, 1s. 10d. Drawings. See London Journal (*Newton's*), vol. 10, p. 337, and vol. 11, p. 148; Mechanics' Magazine, vol. 21, p. 177; Register of Arts and Sciences, vol. 3, p. 193; Engineers and Mechanics' Encyclopædia, vol. 2, p. 432.]

A.D. 1825, February 3.—N° 5090.

**BURSTALL, TIMOTHY, and HILL, JOHN.**—"A locomotive or steam carriage for the conveyance of mails, passengers, and goods."

The locomotive or steam carriage which forms the subject of the present invention appears to be meant chiefly for use on ordinary wads, but may be modified so as to be used on railroads. The only part of the invention, however, which requires notice here consists in a mode of applying brakes to the wheels of the machine, each wheel having the nave, on the side next the machine, formed so as to serve as a friction pulley, and a friction hoop being placed around such part of each nave. These friction hoops are each in two parts, jointed together, and are made to press upon the naves or otherwise by being also jointed to short levers mounted on cross shafts, long levers connected to the latter being used to tighten or slacken the hoops as requisite.

[Printed, 10d. Drawing. See Repertory of Arts, vol. 1 (*third series*), p. 198; London Journal (*Newton's*), vol. 12, pp. 34 and 294, also vol. 13, p. 284, and vol. 14, p. 374; Mechanics' Magazine, vol. 4, pp. 391 and 433, also vol. 6, p. 500; Register of Arts and Sciences, vol. 1 (*new series*), p. 23; Engineers and Mechanics' Encyclopædia, vol. 2, p. 450.]

A.D. 1825, March 5.—N° 5117.

**JAMES, WILLIAM HENRY.**—"Certain improvements on rail-ways, and in the construction of carriages to be employed thereon."

The first part of this invention consists in forming the rails of railways, at those parts of the latter "where curves or turns are to be made with ribs of different elevations, and adapting grooves of different diameters on the peripheries of the carriage wheels to run upon these rails, so as to cause the two opposite wheels on the same axle of the carriage to vary in their circumferences at those parts of the rail where the carriage has to turn, and consequently to run in curves instead of straight lines." The carriage wheels are in effect furnished on their



peripheries with what the patentee says may be called "steps," each wheel, in fact, resembling on its outer surface a number of narrow wheels of different diameters joined together, and the rails being so contrived at the curves or turns, that the wheels on each side of the carriage work upon portions of such diameters as will correspond with the necessary difference between the speed of the outer and inner wheels; this contrivance preventing "the drag" and friction that must take place in carriages of the ordinary "construction when turning curves." The other parts of the invention do not require notice here.

[Printed, *8d.* Drawings. See Repertory of Arts, vol. 2 (*third series*), p. 59; London Journal (*Newton's*), vol. 10, p. 301; Register of Arts and Sciences, vol. 3, p. 276; Engineers and Mechanics' Encyclopædia, vol. 4, p. 361.]

A.D. 1825, April 2.—N<sup>o</sup> 5145.

FISHER, JACOB JEDDERE.—"A new application of railways, "and the machinery to be employed thereon."

According to this invention carriages are constructed in such manner as to be capable of travelling upon an elevated rail. In one arrangement the wheels of the carriage, of which there are four, are placed upon short separate studs or pivots connected to a kind of frame, certain portions of which project downwards and meet below the rail, being also furnished with rings, from which the body of the carriage is suspended. The rail is in this case composed of a deep vertical longitudinal rib, with a horizontal rib or "side plate" on each side of the lower edge, the wheels of the carriage (which are very near together) running upon these side plates. In another arrangement, each pair of wheels is mounted upon one and the same axle, these axles being connected to a frame, from which projections descend to the body of the carriage, the rail in this case consisting of a square tube with a longitudinal slit along the centre of the lower side, and the wheels running upon the portions of the tube on each side the slit. The rail is in each case meant to be suspended or supported from above, and the patentee states that he claims any construction of railway and carriage "which will admit of the bodies to be carried being suspended immediately underneath the railway, while such railway "is supported from above, and its two side plates, upon which the "carriage wheels run, are not independent of each other, but are "fixed to the stock plate or frame, from which the suspension "takes place, so that the said two side plates shall not be inde-



"pendent of each other, and thereby liable to get out of adjustment to each other."

[Printed, *Ed. Drawing.* See London Journal (*Newton's*), vol. 11, p. 98; Register of Arts and Sciences, vol. 3, p. 263; Engineers and Mechanics' Encyclopedia, vol. 2, p. 167.]

A.D. 1825, April 12.—N° 5148.

**BRANDLING, ROBERT WILLIAM.** — "Improvements in the construction of railroads, and in the construction of carriages to be employed thereon and elsewhere."

The object of this invention is "to enable carts to travel both upon railroads and common roads, and to leave the former and return upon them at any angle; this is done by means of elevators cast upon the rail, or made separate, of iron or any other hard substance; by single, double, or triple tyred wheels and scrapers with socket joints and springs, and by moveable shafts with liberating joints."

The wheels of the carts (or carriages) are formed with one side of the tyre higher than the other, or with a groove in the middle of the tyre, the middle thus being lower than the sides, the intention of the patentee apparently being, that when moving on ordinary roads the wheels shall rest upon the highest parts of the tyres, while when upon a railroad they shall work upon the lower portions. The "elevators" consist of short lengths of rail laid alongside the principal rails of a railroad, inclining downwards at each end, and combined with guides, being so arranged as readily to transfer the wheels of vehicles from a road to the rails, or the contrary. The scraper is a short piece of metal, held above the wheel by a vertical arm projecting from the axle, and pressed upon the wheel by a spring; and the moveable shafts are apparently connected to the framing of the vehicle, when necessary, by being passed into openings therein, and secured by a "fixing bolt" and a "centre bolt," being capable of turning horizontally upon the latter when the fixing bolt is removed, or vice versâ, this horizontal movement of the shafts preventing the vehicle from being "dragged off the railroad." The carts may have shafts inserted at both ends, and a number of them be connected together by bars of iron uniting the shafts.

[Printed, *Ed. Drawing.* See Repertory of Arts, vol. 2 (*third series*), p. 203; London Journal (*Newton's*), vol. 11, p. 367; Engineers and Mechanics' Encyclopedia, vol. 2, p. 468.]

A.D. 1825, May 10.—N° 5160.

HILL, THOMAS, the younger.—“ Certain improvements in the  
“ construction of railways and tramroads, and in carriages to be  
“ used thereon and on other roads.”

One part of this invention consists “ in the form or pattern  
“ and use of a carriage or carriages adapted to travel and run  
“ upon railways, streets, and common roads, for the convey-  
“ ance of passengers, and every description of goods, merchan-  
“ dize, and minerals, with the application of moveable or loose  
“ wheels, and moveable or loose flanches to be fixed to the wheels;  
“ also in the use of large stays or staples, to be fixed and applied  
“ to the ends of the blocks over the fore axletree, and for an  
“ eye bolt to be attached to the shafts and frames of the carriages,  
“ by which the carriage or carriages are to be drawn.”

One modification of a carriage is described, which the patentee mentions as being “ adapted to convey twelve inside and twenty  
“ outside passengers; also half a ton of luggage in the fore  
“ part.” “ Its difference or variations from any other railway car-  
“ riage is in its peculiar shape, the doors for luggage being in the  
“ sides of the fore end, and the door for passengers at the back  
“ end.” The hind part of the carriage rests directly upon the  
hinder axletree, “ the seats extending over the wheels, the fore and  
“ hind end of the lower part, for the inside passengers’ feet to be  
“ supported by two flat iron bars perforated with holes to fasten  
“ the woodwork too, and may be placed upon springs or other-  
“ wise.”

The “ loose flanches,” which form an important part of the  
invention, are, in fact, flanches which are to be attached to the  
wheels only when the carriage is to travel upon rails. They are  
composed of rings of metal or other material, so formed as to  
extend partially across the rim or tyre of the wheel, and also pro-  
ject upwards from one side thereof, and they are “ fastened to the  
“ felloes or spokes of the wheels, with bolts, screws, loops, staples,  
“ or otherwise, the flanches to be half an inch thick in the rim.”

The invention is not very clearly described, but it would seem  
that certain “ blocks ” are meant to be placed over the fore axle-  
tree, which in combination with certain stays or staples, or other  
equivalent contrivances, will have the effect of “ keeping the  
“ wheels in a straightforward position upon the railways.”

[Printed, 10d. Drawings. See London Journal (Newton's), vol. 12, p. 833  
Engineers and Mechanics' Encyclopedia, vol. 2, p. 468.]

A.D. 1825, June 14.—N° 5185.

LINDSAY, The Honorable JOHN.—“ Certain improvements in  
“ the construction or formation of the horse and carriage ways of  
“ streets, turnpike, and other roads, and an improvement or addi-  
“ tion to wheels to be used thereon.”

That part of this invention which relates to the construction of wheels consists in forming such wheels with a rim or flange on each side of the periphery, the wheels thus partially embracing the rails on which they run. A wheel may thus be formed having the periphery plain, or the latter may be furnished with cogs suitable for working in gear with a rack laid down in connection or combination with one of the rails, in this case the wheel being applicable for a locomotive engine, and aiding the tractive power of such engine, the rims or flanges, however, resting on the permanent way on each side of the rail, and supporting a part of the weight of the engine. Wheels having the periphery plain may be cast, with the flanges, “in one entire piece,” but in the case of wheels having cogs or teeth on the periphery the rims or flanges are attached after the rest of the wheel has been cast and finished, by bolts. The other parts of the invention do not require notice here.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 2 (third series), p. 280; London Journal (*Newton's*), vol. 11, p. 96; and Engineers and Mechanics' Encyclopædia, vol. 1, p. 102.]

A.D. 1825, October 13.—N° 5267.

EASTON, JOSIAH.—“ Certain improvements in locomotive or  
“ steam carriages, and also in the manner of constructing the  
“ roads or ways for the same to travel over.”

One part only of this invention requires notice here, this consisting in the use of guide wheels, placed so as to work horizontally below the body of a locomotive or carriage, and to bear against the opposite sides of a range of stone blocks, which project upwards between the lines of rails, these guide wheels preventing the wheels of the locomotive or carriage from leaving such rails, the latter being plain bars, and the wheels without flanges. Each locomotive or carriage is provided with two pairs of guide wheels, which are mounted in “blocks” connected to the lower part of the framework.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 11, p. 292; Engineers and Mechanics' Encyclopædia, vol. 2, p. 475.]

A.D. 1826, January 23.—N° 5325.

STEPHENSON, ROBERT.—“Axletrees, to remedy the extra friction on curves to waggons, carts, cars, and carriages, used or to be used on railroads, tramways, and other public roads.”

The object of this invention is to accommodate “the different velocities with which the opposite wheels of the carriage must move when running upon curved parts of the line of rail,” which is effected by adapting a separate shaft or axle to each of the running wheels of such carriage. Each wheel is, in fact, fixed upon one end of an axle, which tapers gradually from the wheel to the other end, and at the latter is provided with a ball, which works in a socket formed to receive it, that part of the axle immediately inside the wheel working in a slotted bearing, which allows the wheel to rise and descend in accordance with any slight inequalities which may exist in the line of rails.

The patentee mentions that although he has described a ball-and-socket joint as being arranged at the smaller end of the axle, “several other modes of constructing a loose joint in place of this might perhaps answer the purpose nearly as well.”

[Printed, &c. Drawing. See Repertory of Arts, vol. 4 (third series), p. 365; London Journal (Newton's), vol. 11, p. 160 and 200; Register of Arts and Sciences, vol. 3, p. 309; Engineers and Mechanics' Encyclopædia, vol. 2, p. 478.]

A.D. 1827, August 14.—N° 5540.

CHAPMAN, WILLIAM.—“An improvement or improvements in the construction of waggons that have to travel on railways or on tramways.”

The object of this invention is to prevent the inequalities of a line of rail or tramway from causing the carriages and waggons which travel thereon to rest at any time upon two or three wheels only, instead of upon the whole number, by which the carriage or waggon is supported, and the invention consists “in equalizing the pressure on the four wheels” by placing under one of the side sills of the waggon or carriage a detached bar of wood or metal “moving upon a centre half way between the axles of the two wheels on that side of the carriage, and resting near the ends upon the journals of those axles, or that the carriage and its load may always rest upon four wheels, notwithstanding any casual disparity of level that may exist between the two sides.”

Different modifications of the invention are described, but the patentee mentions that an equalizing bar as applied to one side of

a four-wheeled railway carriage is not suitable for a carriage having more than four wheels, "because a lateral as well as a vertical motion then becomes requisite to every set of four wheels, and they, of course, require a transome resting upon a centre under the body of the carriage, without which a carriage of six or eight wheels could not move along any curve of railway or deviation from a straight course." He also mentions that the equalizing bar may, if thought desirable, be made elastic, in order to reduce the effect thereon of jolts and concussions, and the invention includes a mode of greasing the axles of carriages by the use of a "compress" of tow, or hemp, or cloth, saturated with tallow or some other unguent. The invention, in fact, much resembles in its main features that of Robert Stephenson, N° 5325; the axles here, as in that invention, being capable of moving upwards and downwards in the bearings in which they work.

[Printed, 8d. Drawing. See *Repertory of Arts*, vol. 7 (*third series*), p. 249; *London Journal (Newton's)*, vol. 6 (*second series*), p. 324; *Engineers and Mechanics' Encyclopædia*, vol. 2, p. 490.]

A.D. 1829, May 21.—N° 5790.

DICK, MAXWELL.—"An improved railroad, and method of propelling carriages thereon by machinery, for the purpose of conveying passengers, letters, intelligence, packets, or other goods with great velocity."

The only part of this invention which requires notice here relates to an arrangement of the wheels of carriages meant to travel upon elevated rails. After alluding to Palmer's invention, in which a single rail only is used, the patentee states that in his arrangement the carriage travels upon a double line of rails, the bearing wheels of the carriage being "deeply grooved," and there being also "safety wheels" connected to the carriage which have plain surfaces, and which, "in the event of the carriage receiving any sudden impulse upwards," act against the lower edges of "safety rails" placed below those on which the carriage travels, these "safety rails" and safety wheels thus preventing the carriage from being dislodged from the upper rails. The framework from which the carriage is suspended is apparently meant to have six bearing wheels (three on each side) and the same number of "safety wheels" arranged below them.

[Printed, 1s. 4d. Drawings. See *London Journal (Newton's)*, vol. 9 (*second series*), p. 168; *Mechanics' Magazine*, vol. 13, p. 253; *Register of Arts and Sciences*, vol. 4 (*new series*), p. 161, and vol. 5, p. 47; *Engineers and Mechanics' Encyclopædia*, vol. 2, p. 503.]

A.D. 1829, May 30.—N° 5796.

WINANS, ROSS.—“ Certain improvements in diminishing friction in wheeled carriages to be used on rail and other roads, and which improvements are applicable to other purposes.”

According to this invention four secondary or friction wheels are employed, “ or two, if applied to two-wheel carriages, made of cast-iron or other proper materials, and of about one-third to one-half the size of the running wheels, and having a rim projecting on one side of each of them, the inside periphery of which is turned smooth and cylindrical; the necks, pivots, or gudgeons of these secondary or friction wheels being but short, they may of course be proportionably small in diameter, and they must be made to turn in brass or other proper bearings affixed to the frame of the carriage, in order to reduce or diminish their friction as much as possible. The four main cast-iron wheels which run upon the surfaces of the two rails of the railway may either be fast or loose upon their axles, or one of them be fast and the other loose, as occasion may require.” “ These axles are made to extend on each side beyond the naves of the main wheels, and are formed into cylindrical necks or pivots, which act underneath the inside peripheries of the friction wheels on each side, and thus hold up or support above the rails the friction wheels and the frame and body of the carriage, together with its load, and when the carriage is moved forward the necks or pivots of the axles roll or turn within the peripheries of the friction wheels, causing them also to revolve slowly, whilst the necks or pivots upon the ends of the axles of the friction wheels revolve still more slowly in their brasses or bearings, and thus the friction is reduced.”

The invention includes a mode of enabling carriages to travel round curves by giving the axles a certain degree of play in the bearings in which they work; and also a mode of lubricating the axles and friction wheels; but the details of these arrangements will only be understood with the aid of the drawings annexed to the Specification.

[Printed, 1a. Drawings. See London Journal (*Newton's*), vol. 4 (*second series*), p. 171; *Mechanics' Magazine*, vol. 12, pp. 299 and 340; *Register of Arts and Sciences*, vol. 4 (*new series*), p. 164; *Engineers and Mechanics' Encyclopedia*, vol. 2, p. 526.]

A.D. 1830, August 31.—N° 5989.

LOSH, WILLIAM.—“ Certain improvements in the construction of wheels for carriages to be used on railways.”

The object of this invention "is to render such wheels more durable and less liable to be damaged or broken than the wheels hitherto in use upon railroads by the violence of the shocks to which they are liable when travelling on railways, and more particularly when propelled with rapid motion along railroads." The spokes, the rims or felloes, and the tires of wheels constructed according to these improvements "are to be made wholly of malleable iron. The spokes are to be joined one to another, and to the rims or tires, and to a cast-iron central nave," whereby "the spokes are all so firmly fixed to the cast-iron nave and to the rim, and united one to another, that they will all act simultaneously to support or sustain the cast-iron nave in the centre of the wheel, and to preserve the true form of the wheel in every respect. By forming those parts of the wheel which are most liable to suffer injury from shocks of malleable iron, and the several parts being firmly jointed, the liability of such wheels to fracture will be greatly diminished."

The invention is described under a variety of modifications, the details of the invention being, however, of such a character that they will not be easily understood without an inspection of the drawing annexed to the Specification. One part of the invention originally described related to forming the spokes of the wheel with "prolongations" or bends, and placing a tyre around these bends, the latter being of concave form on the exterior, and the tyre being made convex in that portion which is to be next the spokes; or, according to another modification, placing a concave tire around prolongations of spokes which are made convex. But according to a Disclaimer inrolled on the 14th of June, 1836, this part of the invention was disclaimed on the ground of its doubtful novelty.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 9 (*new series*), pp. 224, 227, 296, 298, and 351; London Journal (*Newton's*), vol. 6 (*conjoined series*), p. 107, vol. 12 (*conjoined series*), p. 295, and vol. 21 (*conjoined series*), pp. 474 and 477 for disclaimer; Mechanics' Magazine, vol. 18, p. 206, and vol. 29, p. 241; Register of Arts and Sciences, vol. 6 (*new series*), p. 14; Engineers and Architects' Journal, vol. 1, p. 292; Engineers and Mechanics' Encyclopedia, vol. 2, p. 534; Webster's Reports, vol. 1, pp. 197, 200, 202, and 209; Webster's Patent Law, pp. 59, 60, and 114 (also p. 137, case 128, and p. 139, case 130); Dowling's Reports, vol. 7, p. 495; Carpmiel's Reports on Patent Cases, vol. 2, p. 464; Billing on Patents, pp. 54, 197, and 185; Meeson's and Welsby's Reports, vol. 5, p. 387; Law Journal (*Erchequer*), vol. 8 (*new series*), p. 261; Patentees' Manual, pp. 38 and 40 (with disclaimer).]

A.D. 1830, November 4.—N° 6027.

BRAMLEY, THOMAS, and PARKER, ROBERT.—"Certain improvements on locomotive and other carriages or machines



" applicable to rail and other roads, which improvements, or part  
 " or parts thereof, are also applicable to moving bodies on water  
 " and working other machinery."

One part of this invention consists in a mode of connecting the wheels of carriages suitable for railways and other ways to their axles, such wheels being, according to the present invention, furnished with a scew collar which " fits truly upon the round part  
 " of the axle behind or within the shoulder which is formed upon  
 " the axle, in the same manner as the ring of the common mail  
 " coach axle," but in lieu of the three bolts usually employed to prevent the wheel from leaving such axle, certain screws being used in combination with these screw collars, which screws are formed with right and left-hand threads, and so disposed that the motion of the wheel when the carriage is running forward will tend to fasten the collars in their places; sliding bolts or keys or screw pins being also inserted into the screw collars and preventing any possibility of the wheel and axle becoming detached; such detachment, however, being effected when necessary by " turning  
 " round the wheel in a backward direction."

Another part of the invention consists in constructing wheels for carriages meant for the conveyance of passengers and light goods, with spokes composed partly of cylindrical tubes containing helical springs, these being so combined with rods as to form spokes capable of yielding in the case of a shock or concussion happening to the carriage, and such wheels being, for further security and steadiness, furnished with double sets of such spokes, connected to the rim " by loops or joints which are common to  
 " both sets." These arrangements are described at some length and under different modifications.

[Printed, 2s. Drawings. See London Journal (*Newton's*), vol. 8 (*combined series*), p. 363; *Mechanics' Magazine*, vol. 15, p. 349; Register of Arts and Sciences, vol. 8 (*new series*), p. 97; *Engineers and Mechanics' Encyclopedia*, vol. 2, p. 336.]

A.D. 1831, March 11.—N° 6092.

STEPHENSON, ROBERT.—" An improvement in the axles and  
 " parts which form the bearings at the centres of wheels for  
 " carriages which are to travel upon edge railways."

The invention consists in fixing two of the carriage wheels  
 " fast upon the extreme ends of a long hollow or tubular axis,  
 " within which a solid central axis is inserted, extending through  
 " all the length of the hollow," and projecting out sufficiently  
*beyond each end of the hollow axis to enable the weight of the*



carriage "to be supported upon the projecting ends of the solid central axis, around which the hollow axis turns, together with the two wheels which are both fastened as aforesaid upon the ends of the hollow axis."

The middle part of the solid axis is smaller than the parts which sustain the hollow axis, a space being thus left around the solid axis which serves as a receptacle for oil, which is introduced thereto through openings which may be closed by plugs, the patentee mentioning, as one of the advantages of the arrangement, that the bearing of the solid axis, which does not turn round, presses "downwards" within the hollow axis, and so facilitates the spreading of the oil over the acting surfaces. The extreme ends of the solid axis are inserted into sockets which are formed in two parts, and upon which rest the springs which sustain the carriage, such springs being connected to framework which is slotted, so as to embrace the sockets, and be capable of moving slightly up and down thereon; oil boxes being placed below the sockets for the reception of such oil as may flow from the axes and bearings. The invention is minutely described, the details being susceptible of various modifications.

[Printed, 10d. Drawing. See Repertory of Arts, vol. 13 (*third series*), p. 1; London Journal (*Newton's*), vol. 1 (*conjoined series*), p. 202; Mechanics Magazine, vol. 16, p. 477; Register of Arts and Sciences, vol. 6 (*new series*), p. 165; Engineers and Mechanics' Encyclopedia, vol. 2, p. 542.]

A.D. 1831, April 30.—N<sup>o</sup> 6111.

STEPHENSON, GEORGE.—"An improved mode of making wheels for railway carriages."

This invention consists in constructing wheels for railway carriages "with a suitable number of hollow tubes of thin wrought iron to form the spokes, arms, or radii of such wheels," which tubes, after being prepared at their ends with borax to serve as a flux to the wrought iron, "are laid in proper radiating directions into a mould formed of sand, in a suitable manner to receive melted cast-iron, which cast-iron being poured into the central cavity of the said sand mould, will surround and attach to the inner ends of all the wrought-iron tubular spokes at the parts where the said preparation of borax has been previously applied thereto, and thus a nave or centre piece of cast-iron will be formed for the wheel, and also melted cast-iron being poured into the other cavities of the said sand mould will surround and attach to the outerends of the same spokes at the parts pre-

"viciously prepared with borax, and thus the circular rim or felly of the wheel will be formed in cast-iron, and that felly is afterwards to be surrounded with a strong wrought-iron tire or hoop, which is applied when hot around the cold cast iron, so that it may shrink or contract thereon in cooling in order to firmly unite and bind all the parts of the wheel together; and, lastly, the outer edge of the said tyre must be suitably turned and formed to run on the railway."

Different modifications of the invention are described, reference being also made to the invention for which a Patent was granted to the present patentee and William Loah in the year 1816, according to which wheels were formed with solid spokes of wrought-iron, and cast-iron naves and rims, and without the use of borax as a flux, the advantages of this invention over that arrangement being fully set forth.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 13 (*third series*), p. 9; London Journal (*Newton's*), vol. 1 (*conjoined series*), p. 65; Register of Arts and Sciences, vol. 6 (*new series*), p. 207; Engineers and Mechanics' Encyclopedia, vol. 2, p. 540.]

A.D. 1831, September 5.—N<sup>o</sup> 6158.

FORRESTER, GEORGE. — "Certain improvements in wheels for carriages and machinery, which improvements are applicable to other purposes."

This invention consists in "a peculiar mode of combining cast-iron with wrought or malleable iron in the construction of wheels," the invention being also applicable to the framing of steam engines and machinery, the arches of bridges, and other structures. One of the "leading objects" of the invention, however, is stated to be the construction of wheels for railway carriages, and the invention is described specially as applied thereto.

The essential features of the invention are thus set forth:—  
 "I make a skeleton or light frame of wrought-iron or steel, of the shape of the article required, but of considerably less dimensions. This skeleton I render bright, free from oxide, and clean, by any convenient operation, such as grinding, scouring, and filing, to adapt it to receive a coating of lead, or bismuth, or tin, or zinc, or any mixture of those metals, such coating being performed by similar means to that used in the well-known process called 'tinning.' The article to be cast, having been moulded in sand (or loam) in the common way, the

“ skeleton, coated as before mentioned, is carefully laid in the  
 “ middle of the respective parts of the mould, projecting pieces  
 “ being attached to the skeleton to keep it in its proper place.  
 “ The mould is now to be closed, and the cavities formed by the  
 “ pattern are to be filled up with fluid cast-iron, which completes  
 “ the operation.” The ring or rim of the skeleton of a wheel is  
 furnished with a number of holes through which the fluid iron  
 passes, thus effectually binding the cast-iron to such ring or  
 rim.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 13 (*third series*),  
 p. 391; London Journal (*Newton's*), vol. 1 (*conjoined series*), p. 63;  
 Engineers and Mechanics' Encyclopædia, vol. 2, pp. 549 and 587; and  
 Register of Arts and Sciences, vol. 7 (*new series*), p. 73.]

A.D. 1832, April 13.—N<sup>o</sup> 6258.

ROBERTS, RICHARD. — “ A certain [improvement or certain  
 “ improvements in steam engines, and also in the mechanism  
 “ through which the elastic force of steam is made to give impulse  
 “ to and to regulate the speed of locomotive carriages.”

One part of this invention relates to the construction of bearing  
 wheels for locomotive carriages. The boss or nave of each wheel  
 is of cast iron, cylindrical in the main portion, but having a  
 rabbet at each end for the reception of a wrought-iron or other  
 metal hoop, the rabbets being slightly tapered inwards, and the  
 hoops being of corresponding form internally, so that when  
 shrunk on the rabbets they are retained securely thereon. The  
 nave is provided with longitudinal grooves for the reception of  
 the inner ends of the spokes, which are provided with shoulders  
 over which the hoops already mentioned pass, the spokes and  
 nave being thus firmly bound together, and the outer ends of the  
 spokes are “ spread out in both directions ” so that a sort of  
 head is formed upon each, there being rivetted to these heads  
 two rings of wrought angle iron, one on each side, these rings  
 forming the rim of the wheel, and there being finally shrunk upon  
 and rivetted to the latter a wrought-iron tire.

Another part of the invention relates to the construction of the  
 axle of the driving wheels of a locomotive, such axle being formed  
 in two parts, one being hollow and the other capable of turning  
 therein, this arrangement admitting of the two wheels being  
 driven at different velocities. The other parts of the invention do  
 not require notice here.

[Printed, 8d. Drawing. See London Journal (*Newton's*), vol. 2 (*conjoined  
 series*), p. 201; and vol. 13 (*conjoined series*), p. 77; and Mechanics' Maga-  
 zine, vol. 21, pp. 15 and 32.]

A.D. 1832, September 29.—N<sup>o</sup> 6318.

GIBBS, JOSEPH, and APPLEGATH, AUGUSTUS.—“Certain improvements in steam carriages.”

This invention relates in reality to the construction of locomotive engines suitable for propelling carriages, and the only part of the invention which requires notice here consists in an arrangement of the springs and framework of such engines. The springs are connected midway in the ordinary manner to bearings through which the principal axle of the engine passes, but the ends of the springs are connected to the framework by “shackles” or links and pins, each shackle consisting of “one piece of iron,” and one such piece being placed on each side of the spring, one pin passing through the end of the latter and through the lower part of each shackle and another pin passing through the upper part of each shackle and also through a projection from the framework, the pins fitting well in order to obviate side or swinging motion. The framework projects downwards to receive the bearings of a shaft to which motion is given by cranks, spur wheels communicating this motion to the main axle, and “couplers” or links maintaining the shaft and axle at a proper distance asunder, although the springs allow of vertical movement of the framework.

[Printed, 1s. 8d. Drawings. See Repertory of Arts, vol. 13 (*third series*), pp. 265 and 321; London Journal (*Newton's*), vol. 2 (*conjoined series*), pp. 277 and 340.]

A.D. 1833, January 29.—N<sup>o</sup> 6377.

REEDHEAD, JOHN.—“Certain improvements in the construction of coaches, waggons, or other carriages used for the transporting or conveying goods and passengers, to be drawn by horses or propelled by steam or other motive power.”

This invention consists “in the novel construction and arrangement of the fore parts of the carriage, whereby the locking of the wheels is effected with much greater ease and certainty than in the common construction of carriages, and also in the manner of mounting the wheels of the carriage, each wheel having a short axle of its own, and supporting the carriage upon antifriction rollers, by which means the ordinary friction is much reduced; and further, in adapting a friction break or drag to the wheels for the purpose of retarding the progress of the coach in going down hill.” This break consists of an

elastic band of metal, which is mounted at one end upon a stud in the framing of the machine, and passed round a grooved friction or break wheel secured to one of the bearing wheels of the carriage, the other end of the elastic band being connected to a long lever, by acting upon which the band may be drawn tight upon the friction or break wheel. The whole invention is described more particularly with reference to carriages suitable for being drawn by horses on common roads, but the patentee states that "parts" of the improvements are also applicable to "carriages propelled by locomotive power," but he does not distinctly state which are such parts.

[Printed, 1s. 6d. Drawings. See London Journal (*Newton's*), vol. 3 (*conjoined series*), p. 79; Rolls Chapel Reports, 7th Report, p. 376.]

A.D. 1833, October 7.—N° 6484. (\* \*)

**STEPHENSON, ROBERT.**—Improvement, applying to that kind of locomotive carriage used on the Manchester and Liverpool Railway (the first of which was called the Planet), having the two main wheels fixed on a double-cranked axle turned by the engine, to advance the carriage along the edge rail. Makes the tyres of these main wheels without any projecting flanges, and runs them plain upon the edge rails, and places beneath the hinder end of the engine two small wheels with flanges on their tires, to keep them straight on the rails.

2. A "brake or clog," which is caused to press on the tires, by means of a piston working in a small cylinder, supplied with steam from the boiler.

3. Describes a locomotive engine carriage in present use (1833), with the improvements added.

[Printed, 1s. 4d. Drawings. See Repertory of Arts (*new series*), vol. 2, p. 261; London Journal (*Newton's conjoined series*), vol. 3, p. 350; Engineers and Mechanics' Encyclopædia, vol. 2, p. 556; Rolls Chapel Reports, 7th Report, p. 145; Rolls Chapel.]

A.D. 1834, January 13.—N° 6540.

**TIGAR, PENNOCK.**—"Certain improvements in the construction and arrangement of iron and other metal wheels for carriages."

This invention relates to wheels for carriages suitable for being propelled either by animals or by "inanimate power," the patentee stating that he does not limit his claim for "any particular kind of road."

These wheels are "intended to carry the weight transported

"both by suspension of the axle from the upper parts of the  
 "felloe or rim, and by resting the axle upon those spokes or  
 "radii which are below the level of the axle, and between the  
 "axle and the felloe or rim of the wheel," the arrangement being  
 such that "the spokes or radii of the wheel shall perform the  
 "twofold office of propping and suspending at one and the same  
 "time."

The main feature of the invention consists in "screwing the  
 "ends of the spokes or radii into both the felloe and nave, by  
 "which means the spokes will resist either a thrust or a pull."  
 Several different modes of carrying out the invention are described,  
 in some cases the spokes being composed of solid rods, arranged  
 in pairs, and nearer together at the ends which enter the felloe  
 than at those which enter the nave. In other cases solid rods are  
 arranged in pairs, but the two rods forming each pair being  
 parallel. In other cases the spokes are composed of tubes instead  
 of solid rods; in other cases, again, such tubes being filled with  
 wood. In preparing a wheel both the rim or felloe and the nave  
 have holes made in them for the reception of the ends of the  
 spokes, those in the felloe passing entirely through it, and the  
 inner being smaller than the outer ends of such spokes, this ar-  
 rangement admitting of the spokes being inserted from the  
 exterior of the wheel, and being screwed into both nave and fellow  
 simultaneously.

[Printed, 10d. Drawings. See London Journal (*Newton's*), vol. 15 (*con-  
 joined series*), p. 18; and Rolls Chapel Reports, 7th Report, p. 147.]

A.D. 1834, January 25.—N<sup>o</sup> 6550.

HICK, BENJAMIN. — "Certain improvements in locomotive  
 "steam carriages, parts of which improvements are applicable  
 "to ordinary carriages and to steam engines employed for other  
 "uses."

[No Specification enrolled.]

A.D. 1834, October 8.—N<sup>o</sup> 6689.

HICK, BENJAMIN.—"Certain improvements in locomotive steam  
 "carriages, parts of which improvements are applicable to ordi-  
 "nary carriages, and to steam engines employed for other  
 "uses."

One part of this invention relates to the construction of carriage  
 wheels, which are formed as follows:—The nave is of cast iron

or other metal, the felly is of rolled iron, discs of plate iron unite the nave with such rim or felly. The exterior faces of the flanches are cast to the required form, the interior parts of the felly being turned to receive the discs. "The discs are brought to fit the nave and felly accurately and tightly by being pressed to the exact shape and size in a block of metal. The discs may also, if the wheels are destined to carry great weights, be lightly pressed into the recesses of the nave and felly, or the fellies may be expanded by heat, and then allowed to contract upon the disc by cooling, as in the usual way." The discs are secured in their places by four or more bolts or rivets, according to the size of the wheels, passing through the flanches of the nave, and by a few bolts or rivets, which prevent them from separating from the felly. Wheels thus formed may either be adapted for railway or for other purposes.

[Printed, 1s. 2d. Drawings. See London Journal (*Newton's*), vol. 7 (*conjoined series*), p. 265; Engineers and Mechanics' Encyclopedia, vol. 2, p. 568; Rolls Chapel Reports, 7th Report, p. 155.]

A.D. 1834, November 20.—N° 6719.

WHITESIDE, ROBERT.—"Certain improvements in wheels of steam carriages, and in the machinery for propelling the same."

The object of the first part of this invention is to obtain a firm connection between the moving and the moved parts, or between the steam engine and the axle of the wheels which move the carriage. "In order to perform this effectually, the springs usually placed over those wheels are placed in them, and to prevent the twisting force of the machinery from tearing them out, two quadrangular framings are attached to the wheels," these frames being capable of sliding to some extent across each other, and one of them being connected to an axle box having sufficient freedom "for the axle to play" as requisite. The other parts of the invention do not require notice here.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 5 (*new series*), p. 10; London Journal (*Newton's*), vol. 15 (*conjoined series*), p. 46; Engineers and Mechanics' Encyclopedia, vol. 2, p. 569.]

A.D. 1835, March 4.—N° 6781.

BERGIN, THOMAS FLEMING.—"Improvements in railway carriages, which improvements are applicable to other purposes."

The invention "relates to improvements on the apparatus



"called the buffing apparatus," and its object is to apply "arrangements or combinations of coiled springs with rods proceeding from end to end of the carriage, which shall at once offer a most advantageous apparatus for receiving and transmitting the motion from one carriage to another, and also prevent any prejudicial effects of concussion in starting or stopping a train of carriages, and also be highly suitable for preventing any prejudicial effects taking place in the event of two trains coming in contact." The rods rest upon rollers which allow them to move freely backwards or forwards, one rod, however, only being used to each carriage, and "about four feet of coiled or spiral springs," of "graduated strengths," being placed on the rod just within each end of the carriage framing, one end of each of the sets of springs resting against a collar or boss on the rod and the other end against a small box of iron attached to the carriage frame. The rod extends about two feet beyond each end of the carriage, and has at each end a "buffer head," the patentee stating that he has used a welded iron tube in place of a solid rod, and mentioning various advantages as arising from the arrangements described. The frame of the carriage is strengthened by diagonal tension rods.

[Printed, 1s. Drawings. See Repertory of Arts, vol. 6 (*new series*), p. 283; Mechanics' Magazine, vol. 22, pp. 224 and 228, and vol. 23, p. 144; Engineers and Mechanics' Encyclopedia, vol. 2, p. 570.]

A.D. 1835, March 13.—N<sup>o</sup> 6790.

ADAMS, WILLIAM BRIDGES.—"An improved construction of wheels for all kinds of carriages in which springs are commonly used."

This invention is set forth at considerable length, but it consists essentially in employing, instead of spokes, "four or more elastic hoop springs of a circular or nearly circular form, within the circular rim of the wheel, and around the central nave thereof, each such hoop spring being firmly fastened to both the rim and the nave, and forming the only connection between the rim and the nave," and being so arranged that they "will act in correct concert to sustain the weight which is to be carried by the wheel, but by their yielding will ease the joints and concussions which the rim of the wheel will be subjected to in travelling."

The invention is described as being applicable to wheels for railway purposes, as well as to wheels suitable for use on common



roads. In the arrangements described by way of illustrating the invention the nave of the wheel is composed of a kind of frame resembling a cross having four equal arms, the hoop springs being bolted on one side to the ends of these arms, and on the other side to the rim and tyre of the wheel, certain "blocks" being, however, placed between the springs and the inner side of the rim, but the bolts passing through the springs, the blocks, the rim, and the tyre. A side elevation of a "railroad coach" mounted upon four of these wheels is shown in one of the drawings annexed to the Specification, the wheels being all of the same and of considerable diameter, the patentee mentioning that wheels of large diameter made according to this invention will be "more springy" than small wheels, for which reason carriages which admit of all the four wheels being of large size will be very suitable for wheels of his improved construction. The circular springs may be composed of either one or two strips of steel plate, and strengthened if necessary by shorter additional plates. And a mode of strengthening the wooden rims of wheels for use on common roads is described in which hoops of iron or steel are placed inside such rims.

[Printed, 1s. 6d. Drawings. See London Journal (*Newton's*), vol. 11 (*conjoined series*), p. 170; *Mechanics' Magazine*, vol. 23, p. 129, and vol. 31, pp. 113 and 187; and *Rolls Chapel Reports*, 7th Report, p. 156.]

A.D. 1835, April 4.—N° 6807.

**HARDY, JAMES.**—"A certain improvement or certain improvements in the making or manufacturing of axletrees and other cylindrical or conical shafts."

This invention consists, firstly, "in giving to bars of iron in a heated state peculiar shapes by means of rolling, in order that a series of such bars, when combined in close lateral contact, shall form a cylindrical figure."

Secondly, "in combining in a way similar to that technically called faggotting a series of such peculiarly shaped bars as segmental portions of a cylinder, and after heating such combined series of bars in an air furnace to the proper welding heat, passing them between rollers for the purpose of bringing the particles of metal into a state of perfect cohesion."

Thirdly, "in working such combined bars between cylindrical swages or dies under a tilt hammer or metal helve for the purpose of condensing and hardening the metal and perfecting the

"cylindrical figure, and also in applying the same method of swaging between the dies under a tilt hammer or metal helve to bars of iron, prepared in any of the ordinary modes, either of cylindrical or conical forms for axletrees, cart arms, and shafts, applicable to various purposes."

Among other articles to which the invention is mentioned as being applicable are "axles for locomotive engines and carriages," and with reference to these and other axles the patentee sets forth a mode of operation by which incisions are made in the metal which is to compose such axles, at the parts which will be subjected to the greatest friction, there being driven into these incisions wedge-shaped pieces of steel, the whole being then heated and welded together by the use of dies and hammers, and a hard surface being thus given to the axles at the parts most required. In rounding the axles under the dies the patentee causes a current of air to pass along the lower die, for the purpose of removing "scales" which may be dislodged from the surface of the metal, a jet of water being likewise occasionally used to disengage the tenacious parts of the scale and cool the dies. Shafts in general may likewise be thus treated.

[Printed, *8d.* Drawing. See Repertory of Arts, vol. 13 (*enlarged series*), p. 328; London Journal (*Newton's*), vol. 7 (*conjoined series*), p. 168; Mechanics' Magazine, vol. 42, p. 80, and vol. 50, p. 155; Moore's Privy Council Cases, vol. 6, p. 441; Jurist, vol. 13, p. 177; Rolls Chapel Reports, 7th Report, p. 162; extended for 4 years (*see* No. 12,555).]

A.D. 1835, April 14.—N<sup>o</sup> 6812.

INGLEDEW, JOHN.—"An improved metallic safety wheel and revolving axle."

According to one part of this invention a wheel is composed in the first place of a stout metallic ring forming the nave, this ring being provided with suitable mortices for the reception of the inner ends of the spokes, the outer ends of the latter being secured to a peripheral ring or felloe. This ring is of triangular section in order to combine strength with lightness, but is provided with "swells" or enlargements at those parts into which the spokes are to be inserted, these being then secured by wedges. The inner ends of the spokes are furnished with flanges, which abut against the interior of the nave ring, and notches are formed near to these flanges, wedges being inserted between the spokes and entering these notches, and other wedges being, if desirable, introduced between the flanges, the whole being further secured by the intro-

duction of a circular wedge or "protector," which is driven into the cavity of the nave and abuts against all the flanges of the spokes. The nave is, moreover, "boxed in" by an internal and an external cap, by which the wedges are prevented from moving, and the wheel is surrounded by a suitable tyre.

In another arrangement of wheel a nave of cast iron or other metal is used, in the side of which are grooves for the reception of the inner ends of the spokes, which, having been laid therein, are then secured by wedges, and the whole secured by a plate bolted to the nave. This mode of securing spokes in a nave applies particularly to such wheels as have the spokes in a double line in the nave, but in a single line in the felloe. Instead of the felloe being of triangular, it may be of semicircular section, the shoulders of the spokes being curved to correspond therewith, and for light wheels the felloe may be formed with "hollow spaces" therein, by which the weight of metal is reduced.

In forming a wheel for a locomotive engine, the outer ends of the spokes are placed in mortices in the felloe, and secured by one wedge driven so as to act against the side of the end portion of the spoke, and another wedge which acts against the end itself of the spoke, and tends to force the spoke towards the nave, the junction being covered by a plate bolted to the felloe. The latter consists of a broad thick ring with an internal rib, and a groove in the outer circumference which is filled by a wrought-iron ring, a proper tyre being then placed around the whole.

The improved revolving axle is cylindrical in one portion of that part which is inserted into the wheel, but square near the end, the outer cap of the wheel nave having a square hole for the reception of the square part of the axle, a washer, nut, and "axle cap" retaining the wheel in its place, the axle cap entering a recess formed for it in the outer nave cap, and a flange on the axle entering another recess in the internal nave cap. This arrangement is meant to prevent the access of "grit" to the axle box, which is inside the wheel. This box is enlarged at the end next the wheel for the reception of a collar or boss on the axle, the flange mentioned above being bolted to the box, and the axle being thus kept in its place therein, and the enlarged part of the box containing a hard steel ring, which forms the bearing of the axle, the "end play" of the latter being regulated by a steel screw having a conical point, which is inserted into the inner end of the

box and enters a cavity in the inner end of the axle. An arrangement of axle, however, is described, in which the inner end of the axle is made conical, and enters a conical cavity in the inner end of the axle box, which is itself capable of adjustment, and the flange of the axle box is furnished with a recess which is filled with packing, and covered by an annular plate, a stuffing box being thus formed which prevents the escape of lubricating matter from, or the access of dirt to the axle box.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 16 (*conjoined series*), p. 83.]

A.D. 1835, May 27.—N<sup>o</sup> 6840.

**BERGIN, THOMAS FLEMING.**—"Certain improvements in the  
"method of suspending and adjusting the bodies of railway and  
"all other wheeled carriages."

In this invention, instead of the body of the carriage being mounted upon springs arranged in the ordinary manner, it is suspended from "crane-neck standards," which project upwards from the framing of the carriage, and sustain links composed of rods jointed together and capable of adjustment in length by means of screws, and having combined with them a number of chains, springs, pulleys, and other adjustable rods and apparatus by which the body of the carriage is supported. The details of the invention, which are somewhat complex, will only be understood with the aid of the drawing annexed to the Specification, these details, moreover, being capable of variation. The object of the invention is to so suspend carriages requiring the use of springs, "that whatever may be the number of springs upon or  
"from which any individual carriage may be suspended or hung,  
"the elasticity of all the said springs shall be brought into play  
"by any load," upon whatever part of the carriage such load may be placed, "or by any concussion of the wheels against stones or  
"other obstacles or inequalities of the road over which the said  
"carriage may run; or, in other words, in such a manner so as  
"that all the said springs shall be affected alike, or nearly so,  
"that is, compressed or extended alike, as the case may be, by  
"the imposition of a load upon the said carriage, or whenever a  
"concussion or jolt takes place by any one of the wheels coming  
"in contact with a stone or other abrupt obstacle."

[Printed, 1s. Drawing. See *Mechanics' Magazine*, vol. 24, p. 2.]

A.D. 1835, August 14.—N° 6880.

DAY, JOHN.—“ An improved wheel for carriages of different descriptions.” “ The said improved wheel is manufactured wholly of bar iron, by welding wrought-iron bars together into the form of a wheel, whereof the nave, spokes, and rim, when finished, will consist of one solid piece of malleable iron; and the mode whereby the said bars of malleable iron are fashioned and united into the shape of a wheel, is as follows :”—Suppose the improved wheel is intended for tram waggons which are to be used upon trough or plate railroads or tramroads, the several spokes or arms for the wheel are first prepared, each arm being made out of two pieces of bar iron. For this purpose two suitable lengths or pieces of rolled iron bars, two inches broad by half an inch thick, are cut off to proper lengths, and after bending one extremity of each piece in a suitable manner, the flat surfaces of the bars are applied together, so that they will leave a triangular eye open between them. Then at one welding heat of the angular meeting of the two bars, they are welded together, and after interposing a corresponding wedge-like filling piece, within the opening of their triangular eye, the whole of the end is submitted to another welding heat, and the two bars are welded to the two inclining sides of the filling piece, so as to form one mass therewith, and then that mass is moulded whilst it remains hot into the exact wedge-like shape requisite for forming a sectorial portion of the central nave of the intended wheel, by inserting the angular point, which is formed by the welded junction of the two bars into an iron mould, which is suitably formed, and by hammering on the shoulders, which the two bars form by closing together around the wedge filling piece, the same is completely surrounded.

Then the said shoulders and the flat surfaces of the two bars are welded together at another heat for forming the arm or spoke of the wheel, each spoke being afterwards bent at the outer end into two curved branches constituting portions of a rim, and the ends of these branches being afterwards united by welding, the nave being formed by welding all the inner ends of the spokes to two round plates, and an external rim being placed around the branched ends of the spokes. The whole operation is minutely described, filling pieces being inserted where necessary, and such moulds and other articles used as are needful to bring the wheel



into its proper form, the exterior rim being of shape corresponding with the particular kind of rail on which the wheel is meant to travel.

The patentee includes, in his Specification, certain modes of fixing a "box" into the centre of the wheel, and also of connecting the wheel to its axis, but states that he does not make any claim thereto.

[Printed, 10d. Drawing. See *London Journal (Newton's)*, vol. 16 (*conjoined series*), p. 25; *Law Journal (Chancery)*, vol. 23 (*new series*), p. 502; *Ellis and Blackburn's Reports*, vol. 2, p. 69; *Macrory's Reports*, pp. 184, 193, 203, 209, 221, 223, 225, 226, 227, and 228; *Law Times*, vol. 29, p. 10.]

A.D. 1835, August 17.—N<sup>o</sup> 6885.

PINKUS, HENRY.—"Improvements n inland transit, which  
"improvements are applicable to, and may be combined with an  
"improved method of or combination of method and apparatus  
"for communicating and transmitting or extending motive power,  
"by means whereof carriages or waggons may be propelled on  
"railways or roads, and vessels may be propelled on canals."

One part of this invention relates to a mode of applying a brake to a railway carriage, and consists in attaching to one of the travelling wheels of such carriage a pulley, around a portion of the breadth of which is passed a wrought-iron friction band, furnished on its inner side with cleats, into which are driven wedges of wood, forming a lining to the band, the latter being tightened on the pulley at pleasure by means of a tumbler lever and weight, which the patentee calls a "pendulum," and which when sustained in one position has no effect upon the band, but upon being liberated falls into such a situation as to draw the latter tight. The "pendulum" may be acted upon by a chain proceeding therefrom to the "platforms of the engines."

Another part of the invention consists in the employment of rods to connect the wheels on one side of a carriage together, which rods are not rigid, but have one of the eyes or loops, by which they are connected to the wheels, attached to a spiral spring; this arrangement enabling the rod to accommodate itself to any slight inequality which may exist in the diameters of the wheels.

The brake pulley mentioned above seems meant not only to serve as such, but also to convey motion from the engine to the wheels of the carriage, a band passing from a pulley driven by the engine around a portion of the breadth of such brake pulley.

[Printed, 2s. 6d. Drawings. See *Mechanics' Magazine*, vol. 23, p. 65.]

A.D. 1835, September 24.—N° 6895.

**MASON, WILLIAM.**—"Certain improvements on wheels, boxes, " and axletrees of carriages for carrying persons and goods on " common roads and railways."

The first part of this invention consists chiefly in a mode of constructing the felloes of wheels. The felloe consists in the first place of a series of segmental parts " which overlap each other " at the joints," these parts being composed of rolled iron, and having the edges projecting upwards, a space or groove being thus left between the edges, which is fitted with wood, a tyre being then shrunk upon the whole, and such tyre being flanged if the wheel is for railway purposes, but without a flange if the wheel is to run on common roads. The spokes of the wheel are composed of bars, having collars at a short distance from the ends, and in putting a wheel together one end of each spoke is inserted into an opening in the felloe, and the other into an opening in the nave, the tyre being shrunk on after all the spokes and the parts of which the felloe is composed have been put together. A nave is described as having its outer portion of cast iron, surrounding an inner portion of wood within which is a tube of metal, the whole nave being strengthened by iron hoops.

Another part of the invention consists in constructing axle boxes of wrought iron, " when the same have a series of longitudinal " recesses or grooves formed therein." Different modes of carrying out this part of the invention may be employed, the object being to combine strength with lightness.

Another part of the invention relates to that description of axle " which is keyed or made fast in the nave of the wheel." The axle may be either solid or hollow, but the axle described is hollow, and has conical collars placed thereon, which are adjustable, and serve to " prevent the play of the wheel endways." The axle is made fast to the wheel by means of keys, and a nut which screws upon the end of the axle, there being also, outside the nave, a plate, in the middle of which is a screw, which passes into a screw thread inside the end of the axle, certain bolts also passing through the nave, and having nuts thereon outside the plate. An axle box is also described as consisting of a tube which passes from side to side of the carriage, the outer portions, which are screwed to the other part, forming the bearings of the axle, and being filled at the ends by a " screw nut " which sur-

rounds the axle, and works against conical collars such as those already mentioned. Such boxes may be connected to a carriage, or to the springs thereof, by suitable means.

[Printed, 10*l*. Drawing. See *Repertory of Arts*, vol. 6 (*new series*), p. 20; *London Journal (Newton's)*, vol. 15 (*conjoined series*), p. 24; and *Engineers' and Mechanics' Encyclopedia*, vol. 1, p. 120.]

A.D. 1835, November 5.—No 6923.

DUNDONALD, THOMAS, Earl of.—“Improvements in machinery and apparatus applicable to the purposes of locomotion.”

One part of this invention consists in so arranging the parts of locomotive engines that the most weighty portions of the apparatus shall be much nearer the ground than usual, greater steadiness in the movements of the engine being thus obtained, and the lower portions of the engine, in case of the breakage of the wheels or axles, or of the wheels leaving the rails, acting in the manner of a sledge, and by its friction on the ground stopping the motion of the engine, and of any carriages which may be connected thereto.

Another part of the invention consists in forming the bearing springs of railway engines and carriages of cakes of india-rubber, cork, or other suitable elastic material, enclosed “as it were within inverted boxes resting on the contents;” and such springs being used either “jointly with or in lieu of metallic springs.”

Another part of the invention consists in applying guides to the wheels of railway carriages, these guides consisting in effect of long inverted troughs, which are suspended by links or legs from the axles of the carriages, such troughs partially embracing, but not touching the rails. The wheels run in openings formed for them in the upper portions of these inverted troughs, and near to each wheel is a clog or drag, having the lower portion of wedge-like figure, and the part above that of curved figure corresponding with the outer circumference of the wheel, these clogs or drags being connected to the guides and brought into action when necessary by releasing a catch from a lever or handle connected to one of the links or legs mentioned above, when the wedge-like parts of the drags will come into contact with both wheels and rails, and so act both as breaks and as skids. These clogs or drags may vary both in number and arrangement, this part of the invention including the use of a drag which is suspended from the frame of the carriage between the wheels, and which may be



depressed by the employment of a lever, so as to act as a skid upon the rails, and, if necessary, lift the carriage wheels therefrom.

Another part of the invention consists in suspending the framework and body of a railway carriage "below and from the axles" thereof," instead of such framework and body being above and resting upon such axles, the centre of gravity of the carriage being thus lowered, and greater steadiness of motion being thus obtained. Different modes of carrying out this part of the invention may be adopted, and the frame and body of the carriage may either be suspended from the axles through the medium of springs, or of "iron or other non-elastic straps." Carriages thus constructed may be furnished with guides such as those described above, or with guide rollers "descending on one or both sides of "the rails," in which case the bearing wheels may be without flanges. And certain "side plates" may also be employed, in combination with guide rollers, for the purpose of clearing the rails from impediments to the progress of the carriage wheels.

The invention includes a variety of other particulars, none of which, however, require notice here.

By a document which was enrolled by the patentee on the 16th of November 1836, that part of the invention which relates to forming the bearing springs of railway engines and carriages of india-rubber, &c. was disclaimed on the ground of want of novelty.

[Printed, 2s. 2d. Drawings. See London Journal (*Newton's*), vol. 18 (*conjoined series*), p. 318; and vol. 21 (*conjoined series*), p. 475, for Disclaimer; Rolls Chapel Reports, 7th Report, pp. 167 and 175.]

A.D. 1835, December 16.—N<sup>o</sup> 6955.

CARPMAEL, WILLIAM.—(*A communication.*)—"Certain improvements in locomotive steam carriages, parts of which improvements are also applicable to steam engines and boilers in general."

One part of this invention consists in a mode of stopping railway trains or carriages by the employment of a piston, which is made to work backwards and forwards in a cylinder through the medium of an excentric, and to drive to and fro a quantity of oil through a small passage uniting the two ends of the cylinder. The passage is furnished with a stop or valve of such size that when fully open it affords little or no resistance to the passage of the oil, but when partially closed offers such resistance thereto as

to cause the piston to act as a break, and so either retard or stop the motion of the carriage or train. The other parts of the invention do not require notice here.

[Printed, 1s. Drawing. See *Engineers' and Mechanics' Encyclopædia*, vol. 2, p. 576.]

A.D. 1835, December 16.—N° 6957.

COLES, WILLIAM.—“ Certain improvements applicable to locomotive carriages.”

The object of this invention is “ the reducing of the friction of the axles of railway carriages ” by the application of friction wheels, resting on the axles of the wheels which run on the rails of the railway, the axles being prevented getting out of their proper position by parallel guides. These friction wheels are mentioned as being one foot nine inches in diameter, and six inches broad, and sustain the weight of the carriage by being arranged in suitable framing.

[Printed, 6d. Drawing. See *London Journal (Newton's)*, vol. 10 (*conjoined series*), p. 291; *Mechanics' Magazine*, vol. 29, pp. 136 and 179, also vol. 30, p. 230; *Engineers' and Architects' Journal*, vol. 1, pp. 226, 340, and 408.]

A.D. 1835, December 16.—N° 6961.

BOOTH, HENRY.—“ An improved method of attaching railway carriages together for the purpose of obtaining steadiness and smoothness of motion.”

[No Specification enrolled.]

A.D. 1836, January 19.—N° 6984.

HARSLEBEN, CHARLES.—“ Certain improvements in the machinery and arrangements for the use of propelling vessels and other floating bodies, as also carriages and other vehicles on railroads, as well as on common roads, part of which machinery is also applicable to other purposes.”

One part of this invention relates to the construction of a wheel, “ the periphery of which admits of change of form by pressure,” the result being that the wheel offers a more extended surface to the ground on which it works than would be the case if the periphery was rigid. Such a wheel is not meant, however, to be employed as the bearing wheel of a carriage, “ but as a super-

"numenary wheel," and in the case of a railway carriage "to act upon the ground on the outside of the rail."

The spokes of the wheel are each composed of a hollow portion united to the nave, and a second and outer portion capable of sliding to and fro to some extent within the first, a spiral spring being inserted between the nave and the inner end of the moveable portion of the spoke. To the outer end of the latter is attached a segment of the periphery of the wheel, the segment being also connected to the hollow part of the spoke by "stretchers," certain studs or cross arms being so arranged as to prevent the segments "from being turned out of the plane of the wheel." The segment of the periphery attached to each moveable portion of spoke is flexible, and thus, as the wheel revolves, that portion of the periphery which is in contact with the ground is flattened by the weight or pressure of the load being carried, such flattening bringing a larger portion of the periphery of the wheel into contact with the ground than would otherwise be the case. Such a wheel, therefore, "assists in the propulsion of the carriage by taking hold of the ground, in addition to the hold of the tire of the bearing wheel on the rail."

Another part of the invention consists in the application of a semi-cylindrical screen to the "leading end" of a carriage, in order to "lessen retardation from atmospheric resistance" when such carriage is moving with great velocity. This screen may be composed of "very light materials," such as canvas or leather, or both, "supported by strips of whalebone, pressed outwards by spiral springs that will yield in case of any accidental pressure from without."

These arrangements are apparently meant to apply both to railway carriages and carriages for common roads. The other parts of the invention relate to the propulsion of carriages, and will be noticed in another series of abridgments.

[Printed, 1s. 6d. Drawings.]

A.D. 1836, January 23.—N° 6989.

BOOTH, HENRY. — "Improvements applicable to locomotive engines and railway carriages."

One part of this invention relates to "a new mode of connecting the carriages together, by which is effected an increased steadiness and smoothness of motion at high velocities, and

" which consists in an improved connecting apparatus, by the  
 " action of which the buffers of the separate carriages of a train  
 " are held in contact with each other, so as to prevent that inde-  
 " pendent, lateral, and serpentine motion which railway carriages  
 " moving at high velocities assume when they are attached toge-  
 " ther in the usual way by a simple draw chain." The connect-  
 ing chain attached to the draw bar of each carriage consists of a  
 double screw (working within two long links or shackles), the  
 sockets of which are spirally threaded to receive the screw bolts,  
 which are fastened together by a pin and cotter, in such manner  
 that by turning an arm or lever connected with the said screw  
 the apparatus is lengthened or shortened at pleasure, to the extent  
 of the long links or shackles above alluded to, in which they  
 work.

Another part of the invention consists in a mode of checking  
 or stopping the motion of a locomotive engine by introducing a  
 throttle valve, slide, or damper into the exhausting steam pipe of  
 the engine, which valve, slide, or damper is furnished with a long  
 handle, by means of which it may be wholly or partially closed with-  
 out shutting off the steam passing from the boiler to the engine,  
 and will then serve the purpose of a break in checking or stopping  
 the motion of such engine.

[Printed, *ed.* Drawing. See Repertory of Arts, vol. 5 (*new series*), p. 340;  
 London Journal (*Newton's*), vol. 10 (*conjoined series*), p. 33; Engineers'  
 and Mechanics' Encyclopedia, vol. 2, p. 576.]

A.D. 1836, April 23.—N° 7069.

KOLLMAN, GEORGE AUGUSTUS.—"Improvements in railways  
 " and in locomotive carriages."

One part of this invention relates to guiding carriages, and  
 preventing them from being thrown off the rails. One mode of  
 effecting this consists in placing between the ordinary rails of the  
 railway a third rail, against the opposite sides of which wheels  
 mounted horizontally below the body of the carriage are made  
 to bear, this preventing divergence of the carriage laterally, while  
 a flange along each side of the upper part of the rail prevents the  
 carriage from rising. According to another arrangement a hollow  
 rail or trunk is sunk into the ground, wheels travelling inside  
 such trunk which are placed upon shafts projecting downwards  
 from the carriage through a slot in the top of the trunk. In each  
 case the bearings of these wheels are so connected to the axles of

the carriage that the latter is directed in passing round curves, and by these arrangements flanches, either upon the bearing wheels of the carriage or upon the bearing rails, are dispensed with.

[Printed, 6d. Drawing. See *Repository of Arts*, vol. 7 (*new series*), p. 188: *London Journal (Newton's)*, vol. 18 (*conjoined series*), p. 388.]

A.D. 1836, April 23.—N° 7070.

MASSEY, EDWARD JOHN.—“Improvements in railway and “ other locomotive carriages.”

According to this invention two quadrangular frames constitute the main framing of the carriage, there being one pair of wheels to each frame. “These two frames are coupled together one behind “ the other by a bolt, there being a washer between the frames to “ keep them apart, the bolt having a head at one end and a split “ cotter through the other,” or they may be connected “by screws “ and nuts, by which means the two frames, though securely held “ together, are capable of movement in case of any inequality of “ the level of the railway or other road on which the locomotive “ carriage runs.” “If the locomotive carriage have three pair of “ wheels, then there are to be three frames, connected to each “ other in like manner.”

[Printed, 6d. Drawing. See *Engineers' and Mechanics' Encyclopedia*, vol. 2, p. 678.]

A.D. 1836, May 10.—N° 7089.

WADDINGTON, RICHARD, and HARDMAN, JOHN.—“An “ improved method of making and constructing wheels for railway “ carriages.”

[No Specification enrolled.]

A.D. 1836, August 6.—N° 7162.

REINAGLE, RAMSAY RICHARD.—“Improvements in the con- “ struction of carriages for the conveyance of persons or goods or “ merchandize.”

This invention consists, firstly, in “the suspension of the body “ of a carriage upon springs attached to the upper part or “ roofing,” the frame of the carriage being connected to short axles on which the springs will rest, “whether placed under the “ roof's projection, or on it, or against the side of the body,

" or within the body, or if hooked to the body, from a connecting bar, from arm to arm, or upon traversing bars across the top of the framing, in the inside or outside, and by any means of elastic india-rubber rope or chains," this part of the invention also including " the employment of two large wheels at the centre of the body," and " separating the body from the usual connection with the first wheels and framing on which the driver and outside passengers may sit," thus giving to the body of an omnibus or other four-wheeled carriage " the easy draught and simplicity of a two-wheeled one." The body is united to the " front action " by means of " two pair of draught shaft arms," composed of rods of iron united by open or angle work, these arms passing from the axle of the large wheels to the front frame.

Secondly, the invention relates to the construction of " elastic anti-concussion wheels of larger dimensions than ordinary." One wheel is described in which the spokes are composed of bars or strips bent into an elliptical or nearly elliptical form, the ends of these bars being secured in openings in the nave by wedges. Another wheel is described in which the bars or strips composing the spokes are bent into a more oblong figure than in the wheel mentioned above, this wheel being less elastic than the first. And a third wheel is described in which the spokes are composed of bars bent " over a form the shape of an egg," a leg projecting from one part of the bar thus bent being connected to the nave of the wheel, and the opposite part of such bar being united to the felloe, this wheel being " inflexible or incompressible." The spokes of all these wheels are connected to " trice-formed iron tires or hoops," and the spokes of the first-named wheel are sustained near the nave by T-formed rests, while in all the three large flanges are used which extend beyond the nave and aid in supporting the spokes. This part of the invention includes the casing of the wooden felloes of ordinary wheels with plates of iron, and the forming of tyres for railway wheels with a semi-circular groove therein, there being a raised flange on one side of such groove, such tyres being adapted to run upon rails having semi-circular upper surfaces.

Another part of the invention consists in " shaping the tenons of wooden spokes wedge-formed," and inserting them into correspondingly formed mortices in the nave. " The angular cuttings of the mortices will prevent splitting."

Another part of the invention consists in a mode of facilitating the turning of a carriage "by employing triple arms, carrying "friction rollers within a circular box or case, capped over to "keep out dirt," this circular box or case being apparently meant to form the front frame of the carriage mentioned with reference to the first part of the invention.

Another part of the invention consists in forming a carriage pole of blades of steel, "bowed elliptically to afford a spring "power," and having for a leader or leaders a piston rod acting upon a powerful spring within a tubular head, the object of this spring being "to keep each horse to his equal share of work," while the spring action of the parts forming the pole "will save "much strain upon the carriage in sudden starting."

Other parts of the invention relate to the arrangement and application of breaks to railway carriages. Each wheel of each carriage of a train is supplied with a break, which may consist either of an elastic band or strap passing over a portion of the wheel, or of a segmental block, and such breaks may be mounted in any convenient manner so as to be brought into action upon the wheels through the medium of a longitudinal rod, each carriage being provided with such a rod, and the rod of one carriage being jointed to that of another by any suitable means, the rods of the various carriages of a train thus forming one continuous line. The rod of the carriage at each extremity of the train, however, each of which carriages becomes the leading carriage alternately, is fitted in a different manner from those of the intermediate carriages. The rod of each such carriage is enlarged and hollow, whereby a chamber is formed for containing the traction or "drag rod," which is surrounded by two spiral springs, the traction rod having, moreover, a collar upon it "which acts upon "the train through the medium of one spring in giving motion "and through the other in resisting its progress," this collar being of larger diameter than the springs, and moving in an enlarged part of the chamber, thus when the drag rod is acted upon by the engine in drawing along the train the spring in front of the collar is compressed, and the longitudinal rods of the various carriages are so acted upon as to keep the breaks out of contact with the wheels, but upon the speed of the engine being slackened the impetus of the carriages causes the hollow rod of the leading carriage to be driven forward upon the drag rod, and the spring behind the collar of the latter then so acts upon the longitudinal



rods as to cause them to press the breaks upon the wheels. The details of these arrangements are minutely described, and include the use of a "sliding stopper" for "maintaining the breaks or regulators in the required position when not in action." The collar mentioned above as being upon the traction rod, and moving in an enlarged part of the chamber, is prevented from acting to an injurious extent upon the springs on each side of it by coming in contact with the ends of such enlarged part of the chamber after moving through a certain distance.

The invention includes a mode of constructing the bodies of carriages "by panelling of sheet metal (iron principally) over an iron framing."

[Printed, 1s. 4d. Drawings. See Repertory of Arts, vol. 7 (new series), p. 200.]

A.D. 1836, September 22.—N<sup>o</sup> 7191.

VAN WART, HENRY, and GODDARD, SAMUEL ASPINALL.—(*A communication from William Church.*)—"Certain improvements in locomotive steam engines and carriages, parts of which improvements are applicable to ordinary steam engines and other purposes."

One part of this invention relates to the running wheels of locomotive engines and carriages. These wheels, "which are also applicable to other carriages, are constructed partly upon the plan of Mr. Benjamin Hick's patent disc wheels, but improved in the facility of construction as well as in strength and lightness." The wheels are composed entirely of iron, "and they have slender spokes, made of thin bars of iron, fixed at their inner ends into the box or nave, by having the ends of the metal upset in the shape of a dovetail, which are made fast in the nave by caulking, and at their outer ends the spokes butt against the ring of iron which forms the felloe" of the wheel. The spokes are boxed in on each side by a circular plate or disc of sheet iron, these plates being confined in their situations by a series of tenons formed on the edges of the spokes, these tenons being passed through corresponding mortices in the disc of the wheel, and afterwards rivetted to the outsides of the discs. The outer edges of the discs are upset in the form of a dovetail, "and inserted into grooves in the ring or felloe by heating the ring and allowing it to shrink on to the edges of the discs, after



" which the ring is caulked or rivetted upon the dovetailed edges,  
 " so as to secure the discs firmly thereto."

The other parts of the invention, which are described at some length, do not require notice here.

[Printed, 4s. 6d. Drawings. See London Journal (*Newton's*), vol. 12 (*conjoined series*), pp. 267 and 321; and Rolls Chapel Reports, 7th Report, p. 179.]

A.D. 1836, November 8.—N° 7217.

SMITH, JAMES ELNATHAN.—(*A communication.*)—Certain improvements in railways, and on locomotive carriages to work on such railways."

[No Specification enrolled.]

A.D. 1836, December 9.—N° 7252.

YATES, JOHN.—" Certain improvements in tramroads or  
 " railways, and in the wheels or other parts of carriages to be  
 " worked thereon."

That part of this invention which relates to the wheels of railway carriages consists in forming such wheels with tyres of different sizes, each wheel in fact resembling "two wheels of different diameters placed side by side and concentric with each other." The larger of these is covered with a tyre having a flat outer surface, and is meant to travel both on ordinary roads and on tramways, while the smaller wheel or circle is provided with a tyre which is hollowed or curved in such a manner as to be suitable for travelling upon an "edge rail." This arrangement permits of tram and edge rails being laid down alongside of each other, the wheels being capable of travelling upon either, or upon both if it should seem desirable, and by this contrivance a greater bearing surface is obtained for the wheels in those parts of a railway which form an incline, the rails being so arranged at such parts as to receive both tyres.

[Printed, 10d. Drawing. See Rolls Chapel Reports, 7th Report, p. 178.]

A.D. 1837, May 10.—N° 7369.

HAGUE, JOHN.—" Certain improvements in wheels for carriages."

This invention relates to "wheels which are employed on railways."

The first part of the invention consists in forming each spoke of a wheel of two flat bars which are united at the outer ends, the inner ends, which are to be united to the nave, being some distance apart, but so bent towards each other that a short portion of each bar lies parallel with a corresponding portion of the next, and is bolted thereto, a nave of cast-iron being then run upon and enclosing these short portions. The ring or felloe of the wheel may be composed of wrought iron, the outer ends of the spokes being inserted into mortices or holes formed therein; or a ring of cast iron may be run upon such ends, the latter in either case being "forged into a tenon." In the case of a cast-iron ring being used, however, it should be cast before the nave, and allowed to cool before the casting of such nave, in order to avoid the evils of unequal contraction. Instead of each spoke being composed of two bars it may consist of one bar suitably bent; or four bars may be united at the outer ends, the inner ends standing somewhat apart, and being enclosed in the nave as already described.

Another part of the invention consists in coating the inner ends of spokes, or of any other instruments by which the nave and the felloe are united, with copper or brass, in order "that when the nave is cast thereon the same may be more securely combined with the spokes." These ends of the spokes are first cleansed by the use of an acid, then dipped into water and powdered borax placed thereon, and when dry made red hot and dipped into melted brass or copper, with which they thus become coated, and the nave is then run upon them.

Another part of the invention consists in securing the outer ends of spokes in the holes in the ring or felloe in which they have been placed by heating the spokes and the felloe, and then causing melted borax to run into the joints, and afterwards melted brass or copper, the spokes and felloe being thus "brazed" together.

[Printed, &c. Drawing. See Repertory of Arts, vol. 9 (*new series*), p. 36; London Journal (*Newcomen's*), vol. 12 (*conjoined series*), p. 140; and Mechanics' Magazine, vol. 29, p. 243.]

A.D. 1837, May 13.—N° 7373.

DE BAC, PIERRE BARTHELEMY GUINIBERT. — "Improvements applicable to railroads."

One part of this invention "relates to an improved construction of wheels, which consists of an axletree on which is fixed a

"ring (outwardly polygonal)," this receiving the centre part of a boss or cylinder lined with wood. "The spokes, alternately of different shape, and formed of wrought iron over wood, are placed into the different openings left to receive them on the surface of the cylinder, on each side of which are placed two cheeks," kept tightly in that position by bolts, fastenings, and springs. "The second extremities of the spokes are kept in their position by two outward rings or felloes fastened tightly together by bolts. They also seize hold of another intermediate ring, which is to receive the felloe of the wheel. Felt is placed to separate the side rings from the intermediate ring, and felt is also applied to all the extremities of the spokes. To retain the wheel on the rails a wrought-iron ring is placed and fixed " in such manner "as to have each extremity of its spokes to rest on the different springs before-mentioned, the crease thus formed acquiring a desired degree of elasticity;" and the felloe of the propelling wheels in locomotive carriages "may be made rough to increase the friction."

The invention includes various modes of fixing rails, and also a mode of constructing reflectors for the lamps of railroads, but there is nothing in these parts of the invention which requires notice in the present series of Abridgments.

[Printed, 1s. 10d. Drawings. See *Repertory of Arts*, vol. 9 (*new series*), p. 357.]

A.D. 1837, July 26.—N<sup>o</sup> 7410.

MELLING, JOHN.—"Certain improvements in locomotive steam engines to be used upon railways or other roads, parts of which improvements are also applicable to stationary steam engines and to machinery in general."

This invention consists, firstly, in a new mode of coupling those wheels of locomotive engines which are fixed upon the crank axles and "made to revolve by the direct power of the engine, with the ordinary running wheels of the carriage, mounted upon independent axles, in order that all the wheels may be made to move simultaneously, and prevent the possibility of any of them slipping upon the rails."

This improved mode of coupling the engine wheels "is effected by the application of a pair of friction wheels or rollers, of any suitable diameter, placed between the peripheries of the driving wheels and the running wheels of the locomotive carriage."

These friction wheels or rollers are not required to act, however, except "in those instances where the weight upon all the wheels" is not uniform, or sufficient to prevent some of them slipping "upon the rails." The friction wheels or rollers, or, as the patentee terms them, coupling wheels or rollers, are so arranged, in combination with certain pistons and piston rods, which work in small steam cylinders, to which steam is supplied when requisite from the boiler of the locomotive engine, that on steam being supplied from such boiler to such cylinders the pistons may be made to either press the coupling wheels into contact with the driving and running wheels of the engine or carriage, or to relieve the latter therefrom, at pleasure. Various advantages are mentioned as resulting from the arrangements constituting this part of the invention.

Another part of the invention consists in the mode of employing a drag or retarder to the wheels of a carriage, this being effected by means of rollers connected to levers which are moved when necessary by the admission of steam into a cylinder furnished with a piston and rod, the latter being so combined with the levers as to cause them to produce the effects required.

Another part of the invention consists in the application of "small jet pipes to locomotive engines, for the purpose of" "cleansing the rails from snow, grease, or sand," these jet pipes being placed immediately over the centre of the rail, and swivel cocks being so connected therewith that either steam or hot air, or hot or cold water, "may be blown upon the rails with a similar effect."

Different modifications of the first part of the invention are described. The other parts of the invention do not require notice here.

[Printed, 2s. 2d. Drawings. See *Repertory of Arts*, vol. 10 (*new series*), p. 1; and *London Journal* (*Newton's*), vol. 17 (*conjoined series*), p. 257.]

A.D. 1837, December 5.—No 7497.

COTTAM, GEORGE.—"Improvements in the construction of" "wheels for railway and other carriages."

The invention "relates to certain modes of constructing wheels" "for carriages for railways or roads, and for turnpike roads," "whereby the welding of the spokes with the outer ring may be" "performed with greater facility than heretofore."

Several modes of carrying out the invention are described, but the main feature of the invention consists in rolling bars of iron with one or more ribs projecting from the surface, and then welding the spokes of the wheel to such ribs, so that the bars may constitute the tyre of the wheel. These tyres may either be flat on the outside, and thus be suited for use on common roads, or they may be flanged so as to be suitable for use on railways, and the spokes may be variously formed, being in some cases double, and farther apart at the nave of the wheel than at the point, at which they are welded to the rim or tyre. The nave of the wheel may be either cast upon the spokes or otherwise formed, and sheets of steel, or steel or iron filings, may be used to ensure an effectual welding of the spokes and the ribbed bars. One mode of carrying out the invention is described, in which the wheel, as being formed, is mounted upon a vertical axis, on one side of which is a forge, and on the other an anvil, the wheel being thus constantly heated at one point and hammered at another.

(Printed, 1s. 10d. Drawings. See *Repertory of Arts*, vol. 10 (*new series*) p. 219. *London Journal* (*Newton's*), vol. 15 (*conjoined series*), p. 164.)

A.D. 1837, December 19.—No 7513.

**ROWLEY, EDMUND BUTLER.** — "Certain improvements applicable to locomotive engines, tenders, and carriages, to be used upon railways, and which improvements are also applicable to other useful purposes."

One part of this invention consists "in the application of a novel construction of the buffing apparatus to be attached to locomotive engines, tenders, and railway carriages, and which consists of pneumatic or vacuum springs, either alone or in connection with metallic springs, either of an elliptical or other form, together with a novel plan of connecting the buffing apparatus of the carriage by means of a bolt in the centre of the said apparatus, and being enabled to raise this bolt by a pulley or lever, and so detach a carriage from the train when the same is running, and thus avoiding the necessity of stopping the train at any station upon the line of railway."

An arrangement is described in which the buffers are composed of horizontal bars of timber, which are connected by means of curved metallic bars to the rods of pistons mounted in suitable cylinders, these rods being also connected with a system of metallic springs. The curved bars are connected to the piston rods

by means of swivel joints, "in order to allow of lateral motion," and the buffer bars of one carriage are connected to those of another by means of a bolt which may be lifted out of its place by a cord attached to a pulley or lever. The other parts of the invention do not require notice here.

[Printed, 10*l*. Drawing. See Repertory of Arts, vol. 11 (*new series*), p. 214; Mechanics' Magazine, vol. 28, pp. 321, 412, 451.]

A.D. 1838, January 4.—N<sup>o</sup> 7528.

WORSDELL, NATHANIEL.—"Improvements in apparatus to facilitate the conveyance of mail bags and other parcels on rail-ways or roads."

This invention consists "in applying mechanical means to rail-ways or railroads, and the carriages which run thereon, whereby mail bags may be taken and left at any determined places or stations with the greatest facility, without stopping or retarding the motion or speed of the train of carriages, and by such means the number of places for taking and leaving mail bags may be increased very materially, and the general system of conveyance of mail bags facilitated."

The details of the invention may be variously modified, but the patentee describes an arrangement in which a horizontal bar is mounted in bearings attached to the back of one of the carriages of the train, so as to be capable of sliding to and fro, this bar being furnished with prongs, upon which, on arriving near to a station at which a bag is to be deposited, such bag is hung, and the bar then projected outwards from the carriage, and secured in position by a screw, another prong connected to an upright pillar at the station removing the bag from the carriage, and, if desirable, other prongs connected to such pillar supplying the pronged bar on the carriage with other bags, to be taken onwards by the train. The invention is applicable in the conveyance of parcels as well as of mail bags.

[Printed, 1*s*. Drawing. See Repertory of Arts, vol. 10 (*new series*), p. 237.]

A.D. 1838, February 8.—N<sup>o</sup> 7563.

DEVILLE, JEROME.—"Certain improvements in railroads, and in the carriages to be used thereon."

[No Specification enrolled.]



A.D. 1838, February 21.—N° 7571.

GRIME, JEREMIAH.—“ Certain improvements in manufacturing wheels, which are applicable to locomotive engines, tenders, and carriages, and to running wheels for other useful purposes ; also in the apparatus for constructing the same.”

This invention consists, firstly, “ in the particular arrangement and disposition of such parts as are necessary to form the wheel, which is to be entirely constructed of wrought iron ; and afterwards, by means of suitable machinery or apparatus, the whole is to be compressed and welded into a solid wheel, and during such latter process the fellow, with its flanch, and the spokes and nave or boss, will all be so perfectly united by the working or welding of the metal that no joint, imperfection, or weakness will be perceptible ; but as the wheel will be thus rendered into one mass of wrought iron, and the flanch formed upon the same piece or bar as the fellow, the necessity of a separate tyre iron is dispensed with, and consequently the outer rim or periphery of the wheel is more durable, as it is impossible that the flanche or tyre iron can work off or become loose, it being all welded into one mass.”

Various modes of carrying out the invention are described, in some cases a number of plates being “ piled ” together in forming the wheel, the arrangement being such that the grain or “ end of the iron ” shall always cross or diverge from the centre of the wheel, thus rendering the wheel stronger and more durable. In other cases the wheel consists of bars of wrought iron, the grain of the iron being so arranged as to “ present itself to the rail or road upon which the wheel runs.” In other cases a rolled bar forms the fellow of the wheel, the nave and arms being formed of piled plate iron, or partly of plate and partly of bar iron.

Wheels are also described as being composed of a fellow of solid bar iron, having a flanch formed on its periphery, and being connected with the nave by heliacally coiled springs, this arrangement reducing the concussions given to the carriages in passing over irregularities in the road or way.

The machinery employed in forming these wheels is described in detail, and includes apparatus for punching holes out of plates of metal, in order to form the spaces between the spokes or arms



of the wheel, a cutting tool connected to the shorter end of a lever, and also certain "shears" being employed in this part of the invention. Apparatus for heating and welding the metal composing the wheels is also described, this much resembling a reverberatory furnace, in which the metal intended for the wheels is made to revolve slowly while being acted upon by a "rammer" or other suitable tool; this apparatus being applicable not only in the formation of new wheels, but also in the repairing of old ones.

[Printed, 1s. Drawings. See London Journal (*Newton's*), vol. 14 (*conjoined series*), p. 362.]

A.D. 1838, June 2.—N<sup>o</sup> 7666.

**HARDY, JAMES.**—"Certain improvements in rolling, making, or manufacturing shafts, rails, tire iron, and various other heavy articles of metal, and in the machinery or apparatus used in the same."

According to one part of this invention "the tire irons for wheels" are produced "by a certain process of rolling bars of iron to certain figures, and, after faggotting such rolled bars together, bringing them into the required form by rolling, or by swages attached to a tilt hammer or metal helve." Into these masses of metal longitudinal bars of steel may be introduced, and the rollers may be so arranged as to "reverse their rotary direction after every operation."

In the case of a wheel tire the bars are so arranged that the outside of the tire shall be of steel. And in carrying out the invention "any known machinery or apparatus for communicating an alternate rotary motion," and for "reversing the action of the rollers, for the rolling of iron or steel, or any combinations of iron and steel in a heated state," may be employed.

[Printed, 8d. Drawing. See London Journal (*Newton's*), vol. 14 (*conjoined series*), p. 187; and *Practical Mechanics Journal*, vol. 2, p. 301.]

A.D. 1838, June 25.—N<sup>o</sup> 7703.

**PALMER, GEORGE HOLWORTHY.**—"Certain improvements in steam generators and engines, applicable to locomotive and stationary uses, and in the carriages to be used therewith and otherwise."

[No Specification enrolled.]

A.D. 1838, July 11.—N° 7730.

VAN WART, HENRY, and GODDARD, SAMUEL ASPINWALL.  
 —(*A communication.*)—"Certain improvements in machinery or  
 "apparatus applicable to locomotion on railroads and to steam  
 "navigation, parts of which improvements are also applicable  
 "to land or stationary engines."

One part of this invention only requires notice here, this relating to an improved mode or method of connecting or coupling the locomotive engines, tenders, and carriages one to another, for the purpose of preventing the transverse, or lateral, or wriggling movements which take place from the ordinary mode of connecting.

This part of the invention consists essentially in the adaptation or application of certain projecting parts to the buffers of the engines or carriages, which parts have, by preference, "inclined  
 "or conical sides, as cones or pyramids, and which projecting  
 "parts fit or take into the corresponding recesses or sockets  
 "formed in the buffers of the carriage next to it," any wriggling or lateral motion of the carriages being thus effectually prevented. In order "to allow for any little difference of altitude there may  
 "be between the pairs of buffers of one carriage to those of the  
 "next," the recesses or sockets "may be enlarged in a vertical  
 "direction, which will allow for this difference."

[Printed, 1s. 8d. Drawings.]

A.D. 1838, August 10.—N° 7766.

BEURET, EUGENE, VISCOUNT DE. —(*A communication.*)—  
 "Certain improvements in the construction of railroads and  
 "tramroads, to facilitate the ascent and descent of hills and  
 "inclined planes."

The first part of this invention consists in "the combination  
 "of double sets of rails or bed for the locomotive and the train,  
 "distant from each other, whereby the wheels of the engine may  
 "have a hold or grasp on the surface on which it runs more firm  
 "and tenacious than would be suitable for the train;" and  
 another part of the invention consists in "the use and adaptation  
 "on railroads and tramroads (either in conjunction with or with-  
 "out the invention above described) of certain apparatuses for

"checking the speed of locomotive engines and carriages on "railroads and tramroads."

According to the first part of this invention, a locomotive engine is made to travel upon lines of rails additional to those usually employed, this being done in order to increase the tractive power of the engine, the wheels of the latter being in some cases formed of "two diameters," one of which only travels upon the ordinary rails, while the other works upon extra rails, which are laid down in those parts of the road in which inclines occur; the wheels of the locomotive being in other cases of such breadth and so constructed as to work not only upon the ordinary iron rails, but also upon others placed either outside or inside them, and composed of a substance upon which the wheels will act with greater tractive power than upon smooth iron.

The second part of the invention, which relates more immediately to the subject of the present series of Abridgments, consists in a mode of checking the progress of a train in passing down declivities. The arrangements for this purpose may be variously modified. In one modification, "check rails" are placed between the lines of ordinary rails, such check rails being mounted on pivots and furnished with springs, by which they are pressed towards each other, "rubbers" placed underneath the carriages passing between these check rails, and forcing them asunder, but the result being that the action of the rubbers upon the check rails serves as a break to the train; preventing it from attaining an undue velocity. In another modification the carriage is provided with check rails and springs, and an "uninterrupted rubber" is placed along the line of rails. The patentee terms these check rails and their adjuncts "moderators," and states that they may be varied in power according to the rate of declivity of the incline down which the train has to pass; and springs of various kinds may be used, including not only those of steel, but also springs formed by the employment of wood, or of cylinders containing steam or air; the rubber where desirable consisting of a number of short check rails arranged near together, and having springs of various powers, adapted to the resistance necessary to oppose to the train at different points.

[Printed, 1s. Drawings. See Repertory of Arts. vol. 12 (new series), p. 193.]

A.D. 1838, August 25.—N° 7784.

HADDAN, JOHN COOPER.—“ Certain improvements in the construction of carriages to be used on railways, and in the method of forming the same into trains.”

The first part of this invention consists in constructing an “ under carriage ” or frame, which is suspended by slings or links from axle boxes, having passed through them certain improved axletrees which themselves constitute another part of the invention. The bodies of the carriages rest upon springs connected to the “ under carriages,” and have attached to them eyes of metal, by which they can be raised and removed from such under carriages, facility being thus afforded for substituting the body of a carriage of one class for that of another. These under carriages consist of longitudinal side timbers, connected by cross timbers and diagonal ties or braces and holdfasts, and are moreover provided with small “ safety wheels,” by which the liability of the main wheels to leave the rails is reduced. The axletrees are each composed of a tube, through which a tapering shaft is passed, one wheel being fixed upon the tube, and the other upon the shaft, and the two wheels being thus capable of rotating at different velocities, the axle boxes from which the under carriage is suspended being placed outside the wheels, and the axle boxes being furnished with oil cups and other suitable appendages. By these arrangements a number of carriages may be connected so as to form a train, with only one pair of large running wheels to each carriage after the first.

Various modifications of the details of the invention may be made, in some cases an axle composed of a solid shaft being used, such shaft being provided near the ends with rings, which are made to revolve “ rather stiffly ” within the naves of the wheels, and wrought-iron collars being bolted to the naves of the wheels in order to keep them in place on the axle. The invention is minutely described, the patentee mentioning, among other advantages claimed for his arrangements, that “ the gravity of the “ under carriage and its load is substituted for the buffing and “ drawing springs at present employed.”

[Printed, 10d. Drawing.]

A.D. 1838, August 31.—N° 7792.

CURTIS, WILLIAM JOSEPH.—“ Certain improved machinery “ and apparatus for facilitating travelling and transport on rail- “ ways, parts of which are also applicable to other purposes.”

One part of this invention "consists of a brake for arresting the progress of an engine, and which may also be applied for clearing the line of impediments placed or lying upon it." This brake may be placed either in front of, or behind the engine, but the front of the engine is preferred "because it is made then to act as a means of clearing the line, as above stated."

The brake itself consists of certain "shoes," formed either of metal, or of timber combined with metal, and connected with levers by means of which they can be depressed at pleasure, so as either to serve the purpose of removing an obstruction from the rails, or by their friction against both the rails and the wheels of the engine to bring the latter into a state of rest.

The next improvement relates to "an apparatus to prevent collisions between trains upon the same line of rails," and consists of a "sledge or retarder" formed "like a wedge with its superior end turned up," which, when out of action and connected with a train, is attached to the last carriage, when "the sledge rides free above the rails, and is suspended by spring pieces; but should an accident happen, which would stop the train, one of the conductors immediately detaches the retarder and runs back with it and places it five or six hundred yards behind the broken-down train; then, should not the engineer of the following train observe the train before him and stop his engine, the engine would run into the retarder and would become a sledge; the driving wheels, if not stopped by the great resistance which would now be opposed to them, would skid round in the retarder, and would have no power to move forwards;" the sledge being also provided with buffers, and being so contrived that even when attached to the hinder part of a slow train it will prevent any injurious effect arising from a second and swifter train overtaking the first.

The next improvement relates to a machine or apparatus "by which a carriage may be taken up and attached to a train without stopping the train," this apparatus consisting mainly of a "sheave" mounted on one of the axles of the carriage, and having a rope coiled upon it which is caught by a hook attached to a passing carriage, the rope at first unwinding from the sheave, but afterwards winding thereon again when the maximum speed of the carriage is attained, the sheave being then disconnected from the axle by means of a clutch provided for the purpose.

Another improvement relates to the construction of a wheel which is adapted to run either upon a common road or upon the

rails of a railway. This wheel is formed "as if the conical railway wheel were placed outside of the common wheel. If the wheel be formed of wood, the felloes should be broad enough to take both tires. The outside tire may be the same as that used for a railway wheel, and the road tire the same as usual." The patentee states that the best mode of fixing the spokes "will be alternately to cross them," and that the nave would be best of cast-iron "in the usual way." He also states that the only part of the wheel which he claims is "the form of the ring," and that the best mode of forming the ring is to make the wheel in the usual way, and then shrink the railway tire upon it, and then when this is turned in the lathe, and the edge likewise, the road tire may be shrunk on afterwards; "or the iron tire may be rolled to the entire shape, and the wheel put together upon the usual railway system."

Another part of the invention relates to "a machine or low truck for the purpose of carrying goods or other materials upon a railway." This truck is provided at the hinder part with a shifting frame and wheels which may be removed at pleasure, and such hinder part then lowered to the level of the rails by means of a certain ratchet wheel and excentrics. The carriage containing the goods is then drawn upon the truck by means of a rope actuated by a windlass carried by the truck, and the excentrics are again turned so as to raise the hinder end of the truck in order that the wheels of the latter may be replaced.

The invention includes a number of other particulars, none of which, however, require notice here.

[Printed, 3s. 8d. Drawings. See *Mechanics' Magazine*, vol. 31, p. 97, also vol. 32, pp. 369, 372, 400, 468, and 525; *Engineers and Architects' Journal*, vol. 2, pp. 123, 230, 435, and 447, vol. 3, p. 5, and vol. 6, p. 19.]

A.D. 1838, September 6.—N<sup>o</sup> 7795.

BOURNE, JOHN FREDERICK, and BARTLEY, JOHN, junior.  
—"Certain improvements in the construction of wheels to be used upon railways and other roads, and which improvements are also applicable to the construction of wheels in general."

The invention consists, firstly, in a "peculiar method of preparing and putting together the ordinary parts of such wheels, as the felloe, spokes, or naves; and, secondly, in the application of certain machinery or apparatus for the purpose of banding the tyre, hoop, or rim of locomotive engine, or other wheels



" to be employed upon railways, or of any other wheels where " loose or separate tyres are used."

In forming a railway wheel, a nave is first constructed of either two pieces of bar iron bent into a circular figure, or " by taking a " solid mold from the forge " and cutting or working it as requisite, there being then welded to such nave pieces of flat bar iron of half the length of the intended spokes of the wheel, the edges of these bars standing " in the direction of the running " course of the wheel." To these, again, are then welded other pieces of bar iron, to the outer ends of which have been previously welded curved pieces of metal, forming segments of the intended felloe or rim of the wheel, and then two of the portions of wheels thus fabricated are placed together, with the spokes intersecting each other, and the whole is welded together, forming a complete wheel, the two sets of spokes having been previously dished so as to approach each other at the ends, and " V pieces " being inserted at the points of junction of the segments forming the rim, a tyre or outer rim being then shrunk thereon, or such rim being turned " to the " proper cone and flanch."

Instead of flat bars being used for the spokes of the wheel, round bars or other forms of metal may be employed, and other variations in the details of the arrangements made, as may seem most suitable. Thus a wheel may be formed by first preparing a straight bar (either flat upon its surface or made with a flanch, as upon railway tyres) of the full length of the periphery or felloe of the intended wheel, " and ' jumping up ' or welding one half " of every spoke or arm at equal distances apart from the straight " bar or tyre;" or the arms may be " welded upon the tyre bar " in their whole length " and such bar bent to form the felloe ; a nave being afterwards cast upon the inner ends of the arms. Or a rim or felloe of wrought-iron may be provided with holes into which the outer ends of spokes may be inserted, and rivetted while in a heated state, a nave of cast-iron being afterwards run upon the inner ends of such spokes ; either single or double sets of spokes being provided according to the proposed strength of the wheel.

The mechanism employed for bending the metal intended for the tyres of wheels consists essentially of framing which supports upon the ends of shafts two grooved rollers, which are meant to act upon the flanch portion of the tyre, and a third roller, which has a plain surface and forms the " flat under surface " of such tyre,



and is capable of being placed at different distances from the others, according to the thickness and curvature of the tyre under operation, the first-named rollers being driven by suitable gearing, and the tyre iron being supported while under treatment by "a light platform of rollers" arranged for the purpose.

By a document enrolled on the 2nd of July, 1847, the patentees disclaimed the application of this invention to "the bending of any tyre for wheels other than flanged tyre for railway wheels;" removing also the words "and other roads" and the following portion of the title of the invention from the Specification.

[Printed, 1s. 2d. Drawings. See Repertory of Arts, vol. 14 (*new series*), p. 336; and London Journal (*Newton's*), vol. 15 (*conjoined series*), p. 210 (with Disclaimer).]

A.D. 1838, September 13.—N° 7809.

**WILKINSON, THOMAS.**—"Certain improvements in the construction of tram or railways, and in the carriages to be used thereon."

One part of this invention relates to the construction of wheels capable of running either upon railways or upon common roads, the tyres or bands of which wheels are made flat, like those used on common roads, "excepting that their edges must be slightly rounded," and, "in order to render the draught as light as possible, more especially in the curves or turnings," the wheels rest upon the rails on narrow surfaces only, a slight "concave fluting" being formed in the centre of the tyre or band, "which then presents two parallel sides slightly convex. By this the tyre or band, bearing always on two points a little apart from each other, has a better hold or site; its pressure being distributed and divided, bears less upon each point, and hence the wear and tear upon the rails is less," and when turned upon common roads such wheels "will make less impression upon them. This double bearing has the effect of diminishing the oscillations and preserving the regularity of the progressive motion. In the curves of a railroad the friction might be somewhat increased by employing these wheels if the carriages now in use on railroads were employed where the two axletrees remain parallel; but when the axletrees on arriving at the curve are made to take nearly the direction of the radius of the curve," "there is scarcely any friction whatever."

These wheels are not flanged, and are described as travelling upon rails having a groove on one side, in which rests the lower

edge of a piece of metal placed in line with the rail, and bolted to a longitudinal sleeper, this serving to prevent the wheels from leaving the rails.

The invention also embraces various details relating to arrangements suitable for rendering carriages capable of travelling alternately upon railways and upon common roads, but there is little in these arrangements which properly belongs to the subject of the present series of Abridgments, most of the arrangements indeed being out of operation upon a railway. Carriages are described as being furnished with front axletrees which in passing round curves can be moved so as bring the wheels into correspondence therewith, by means of a lever provided with a wheel which runs in front of the carriage, and, on arriving at a curved part of the line, enters a gorge or channel by which it is caused to move the axletree into the proper position with relation to the carriage; this apparatus being called a "precursor."

Carriages, as well as engines, are also described as being mounted upon a single axletree and two wheels only, and being connected to each other by certain combinations of beams, pivoted together in such manner as to allow of the carriages assuming different positions with respect to each other while passing round a curve; and waggons for the conveyance of sand, earth, and similar materials are described as having the axletrees placed "at the extremities of the body," and the bottom formed in two parts, capable of turning downwards for the purpose of discharging the load, these waggons having four wheels, and the axletrees being connected by beams so jointed together as to permit of the axles assuming different angles with each other. The "precursor" is furnished with blades and brushes which serve to keep the rails clean. The details of the invention are described at considerable length and under various modifications.

[Printed, 3s. 6d. Drawings.]

A.D. 1838, November 3.—N<sup>o</sup> 7852.

DEVILLE, JEROME.—"Improvements in railroads, and in the carriages to be used thereon."

According to this invention, railway carriages "are built to run on all curves whatever." The wheels "are at liberty on the arms of the axletrees, and the axletrees are applied to the carriage in such manner as to allow of movement" suitable for "turning to the straight direction of the road."

“The fore and hind carriage being similar to each other, each axletree has a pole bolt, thus giving liberty of turning horizontally on that bolt. The perch uniting the fore and hind carriage has two spring beds, on the middle of which are adapted the heads of the pole bolts going through the perch. The vehicles are united by a rigid rod or pole run through on one end by the hind pole bolt of the first coach, and on the other end by the fore pole bolt of the following. From the first axletree the symmetrical direction is given to the second axletree of the same carriage by means of a crossed chain or rope passing round two pulleys or circles of the same diameter fixed on each axletree. The motion from the first to the second vehicle being obtained by the rigid rod or pole (uniting the carriages, as explained above), the direction is given to the first axletree to the second carriage by a crossed chain or rope which passes on one side round a pulley or circle fixed to the perch of the first carriage, through which the pole bolt of the hind part is adapted, and on the other side on a pulley or circle fixed in the front axletree of the following carriage. This pulley fixed on the axletree has the double diameter of the other which is on the perch, and thus from axletree to axletree, and from one vehicle to another. In case of heavy loads, such as those of locomotives, for instance, the centre of the circle should be supported by a third axletree fixed in the middle of the carriage borne on two wheels without flanges, the width of which should be calculated according to the smallest curve that is to be run over. The front axletree of the first coach, in case one should give up the idea of having it directed by a conductor, might receive the direction from the road itself. One of the means to be employed is to fix at each end of that axletree between the wheels a fork, the heads of which descending to the rim of the rails would bear four small wheels, which, on merely touching them, would give to that axletree without any violence the perpendicular direction to the road.”

The invention is illustrated by a drawing containing several figures, from one of which it would appear that in some cases horizontal guide wheels are meant to be used in order to prevent a train from leaving the rails.

[Printed, 10d. Drawing.]

A.D. 1838, November 26.—N<sup>o</sup> 7882.

COHEN, ABRAHAM.—“ Certain improvements in the construction of railway carriages, and in the modes of connecting and “retarding railway trains.” This invention consists, firstly, “of certain improvements in the construction of that part of a railway carriage called the wheel and axle,” in which one of the wheels is made “to move freely upon the axle, and the other to be fixed in the usual manner on the other end of the same axle, such axle being mounted in what are usually termed outside bearings,” and this arrangement permitting the wheels to rotate at different velocities. The axle, in fact, consists of a solid shaft passing through a tubular one, a wheel being connected to each and the solid rotating within the tubular shaft, the parts being furnished with suitable shoulders by which their relative positions are maintained.

Another part of the invention consists in “steadying the connection of carriages to each other,” by means of bars which project from the end timbers of the carriages, and pass through “loops” in the timbers of those before and behind them.

A third part of the invention consists in connecting carriages together by means of conical pieces which project from the ends of one carriage and enter into recesses of corresponding form in projections from the next, screws being employed to regulate the distance of one carriage from another, and the projections being secured in the recesses by bolts or pins.

Another part of the invention consists in applying brakes (which may be of any suitable description) in connection with the buffers of railway carriages, these brakes being so contrived that on an obstruction arising to the motion of the locomotive engine, the buffers in front of the first carriage will apply the brakes of that carriage to the wheels, and this effect will be produced successively upon each carriage of the train, bringing the whole into a state of rest. The particular arrangements for carrying out this, as well as the other parts of the invention, may be variously modified. The arrangements described for actuating the brakes include a somewhat complex contrivance of bent and other levers, springs, and other mechanism, and will not be understood without an examination of the drawings annexed to the Specification.

[Printed, 1s. 4d. Drawings.]

A.D. 1838, December 1.—N° 7891.

**DARTHEZ, STANISLAUS.**—(*A communication.*)—"Certain improvements in the construction and arrangement of axles, axle-trees, and the naves of wheels for carriages."

These improvements consist "in a novel mode of relieving the friction caused by the rubbing of the peripheries of the axles against the internal parts of the boxes or naves" as they revolve, by introducing into recesses formed in the solid part of the axle certain antifriction rollers, "the peripheries of which rollers are intended to meet the internal surface of the box or nave of the wheel, and as it revolves to relieve the friction which would otherwise occur from the rubbing of the surfaces of the axle and box against each other."

The details of the invention may be varied, but an arrangement is described in which three antifriction rollers are used, the rollers being cylindrical, but having the ends reduced in diameter, and working in brass bearings placed in the recesses, and the wheel being secured in its place upon the axle by a cap plate mounted loosely upon a reduced part of the axle behind the wheel, and connected to the box of the latter by bolts.

[Printed, &c. Drawing. See London Journal (*Newton's*), vol. 15 (*conjoined series*), p. 86.]

A.D. 1838, December 17.—N° 7911.

**HAWKSHAW, JOHN.**—"Certain improvements in mechanism or apparatus applicable to railways, and also to carriages to be used thereon."

One part of this invention consists in "a contrivance for attaching engines, carriages, or waggons to each other, and for the purpose of bringing them in closer connection with each other," which object "is effected by a single movement and by means of a small eccentric worked between the two ends of the connecting link, but as the eccentric is a substitute for a crank, and consequently the crank may also be here used as a substitute for the eccentric, then this carriage-connecting link may be made to be worked either by an eccentric or by a crank."

An arrangement is described, in which an eccentric is mounted inside a double link formed to receive the hooks of the carriages

to be connected, the turning of the eccentric lengthening or shortening the link at pleasure; but this arrangement may be varied, and the eccentric, if desirable, "may be fixed in the end of the carriage." The other parts of the invention do not require notice here.

[Printed, 10*d*. Drawing. See London Journal (*Newton's*), vol. 15 (*conjoined series*), p. 74.]

A.D. 1839, January 19.—N<sup>o</sup> 7944.

DUGDALE, RICHARD. — (*A communication from Alexander Ricord.*)—"A method or methods of encreasing the security, tenacity, and strength of trams, axles, rods, and other articles made of iron and steel."

This invention consists in making such articles as are exposed to sudden shocks, or great and irregular strains, such as carriage axles, mill shafts, or ships' anchors, "by making the same of two concentric pieces welded together at the end or otherwise secured one within the other, and whether both of the said pieces are hollow, or one of them only, whereby the force of the shock or strain becomes dispersed throughout the external piece without materially affecting the inner, and any tendency to fracture arising from an accidental flaw or imperfection in the metal is confined to the piece, whether outer or inner, in which it occurs, and does not extend through the whole thickness of the beam, rod, shaft, or other like article."

The Specification of the invention is accompanied by a drawing illustrating the application of the invention to a carriage axle, a mill shaft, and an anchor respectively. The axle described would seem from its construction to be meant for use on railways, for which reason the invention is noticed here.

[Printed, 6*d*. Drawing.]

A.D. 1839, February 14.—N<sup>o</sup> 7968.

WORSLEY, FREDERICK CAYLEY.—"Certain improvements in locomotive engines and carriages."

One part of this invention consists in an improvement "in the form and materials of the wheels of the carriages and engines, whereby a certain degree of elasticity is obtained in the spokes thereof."

The spokes of the wheel are double, and are formed of steel, this not only giving elasticity to the wheel but "saving about one-half of the weight."

Another part of the invention relates to applying brakes to the wheels of carriages. In one arrangement the brakes of a carriage next the engine or tender are connected to certain levers to one of which a chain is attached, this chain being coiled upon a pulley carried by the engine or tender, another lever being so arranged as to turn this pulley partly round when necessary. The carriage is connected to the engine (or tender) by means of a short chain, and the arrangement is such that on forcing the pulley partly round this short chain is slackened, and the chain attached to the brake levers tightened, the brakes being pressed against the wheels "with a force equivalent to the resistance of the following train." A similar arrangement may be applied, if necessary, to several or to all the carriages of which the train is composed. In another modification of this part of the invention the buffers of a carriage are made to press, through the medium of springs, brakes upon the carriage wheels, whenever an obstruction to the movement of the carriage causes the buffers to be acted upon. And a contrivance is also described in which the engine or tender is connected to the first carriage of a train by means of a "lewis" or instrument formed in two parts, one of which is furnished with a pin which takes into mortices in the second, and a projecting end piece which enters into recesses in the latter, the effect being that while the two parts are in line with each other they serve as one single piece, but become disconnected in case of the engine or tender moving aside and leaving the rails. Such an instrument may be connected with brake apparatus, and so placed as to hold the brakes out of contact with the wheels of a carriage unless the latter should become disconnected from the rest of the train, when the brakes would instantly fall into contact with the wheels.

Another part of the invention consists in connecting carriages together by means of plate springs, united by clasps or bolts to the ends of the carriages, and the ends of the springs being capable of being joined by pins, this arrangement serving the purpose not only of a coupling but also of a buffer. The other parts of the invention contain nothing which requires notice here.

[Printed, 1s. 4d. Drawing. See *Inventors' Advocate*, vol. 1, pp. 19 and 37.]



A.D. 1839, April 9.—N° 8026.

PARKIN, THOMAS.—“Improvements in railroad and other carriages, in wheels for such carriages, and in roads and ways on which they are to travel.”

One part of this invention consists in combining with a carriage “the means of causing the hinder axletree to turn on a centre pin instead of the fore axletree” as most usual; this part of the invention, however, apparently being only meant for use when the carriage is travelling upon a common road, as when travelling upon a railway the hinder axletree is to be fixed in a position parallel with the front axletree by means of a handle and a spring catch. A brake is also described as being applied to the back of one of the fore wheels of the carriage, when requisite, by means of a long lever extending upwards.

Another part of the invention relates to wheels meant exclusively for travelling on railways, and consists in “two peculiar modes of combining wood and iron together, so as to obtain wheels of great strength; one mode presenting at the periphery a surface of wood to roll upon the iron rails, and the other mode having the wood covered with a ring or tire of iron, by both of which modes the destructive effects of concussion are avoided, and travelling rendered much more easy.” The main feature of this part of the invention consists in the employment of pieces of wood extending from the nave to the periphery of the wheel, and secured by bolts between plates or cheeks and rings. This part of the invention also includes the use of a ring to form the flanch of a railway wheel, which ring may be easily replaced and removed when worn out.

Another part of the invention relates to the wheels of carriages which are meant to run alternately upon common roads and upon railways; and consists “in combining a felloe or tire of iron to run upon the common road with a felloe composed of short blocks of wood, having the grain nearly in the direction of the radius, secured to the side of the iron felloe, the wooden felloe to run upon a railway placed on the common road, the iron felloe being of larger diameter than the wooden felloe, for the purpose of forming a flanch to prevent the wheel running off the rail, and of keeping the wooden felloe clear of the ground when running on the common road.”

The invention is described at considerable length, and includes a multitude of particulars which do not require notice here. And by two Disclaimers, one of which was inrolled on the 27th of April, 1841, by the above-named Thomas Parkin, and the other on the 24th of July, 1843, by Thomas Harper Bennet, to whom the patent appears to have been assigned, all the particulars mentioned above, as well as a number of others, were disclaimed.

[Printed, 1s. 6d. Drawings. See Repertory of Arts, vol. 13 (*new series*), p. 157; London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 255; Mechanics' Magazine, vol. 31, p. 146, also vol. 32, pp. 162, 258, 353, and 418, and vol. 40, p. 20; Patent Journal, vol. 5, p. 130; Webster's Patent Law, p. 140, case 158; Inventors' Advocate, vol. 1, p. 147; Carpmael's Reports on Patent Cases, vol. 2, p. 677; Law Journal (*Erchequer*), vol. 23, p. 217 (with Disclaimer).]

A.D. 1839, April 13.—N° 8031.

GILLOTT, JOSEPH, and WALKER, THOMAS.—“Improvements  
“ in engines and in carriages to be worked by steam or other  
“ motive power.”

One part of this invention relates to “a novel apparatus designed  
“ to supersede the ordinary ‘buffers’ for connecting the carriages  
“ of a railway train together,” this consisting “principally of a  
“ joint formed by the combination of two sets of three concentric  
“ metallic cups (or cups and balls) whereof the middle cup of  
“ each set is provided with a suitable flange or plate for fastening  
“ to the frames of the carriages to be united, the middle cups  
“ having a free motion in every direction between the outside  
“ and inside cups, yet never permitting the parts to separate  
“ from their mutual contact.” The patentee mentions that this  
part of the invention is “susceptible of numerous modifications,”  
two of which are described in detail.

Another part of the invention relates to “an improved buffer  
“ for railway carriages, of a more compact and convenient form  
“ than those in ordinary use.” The essential feature of this part  
of the invention consists in the “circular arrangement of three or  
“ more helical springs,” each of which makes “but a single  
“ revolution when not compressed,” such springs being placed  
around the shaft of the buffer.

Another part of the invention relates to an improved mode of  
“ combining the mutual action of the wheels and axletrees of  
“ carriages, the object of which is to make one wheel of each pair  
“ of wheels fast to their axletrees, so that they shall both revolve

"together while the other wheel of the same pair shall run loose on the said axletree," the patentees stating that by this arrangement "whenever the two lines of rail or road over which the pair of wheels roll depart from right lines," "each individual wheel will be at liberty and disposed to take those varied velocities which the undulations or curves require." The patentees recommend that in applying this invention to railway carriages "the axletree of one pair of wheels to each carriage be put upon a centre pin, sufficient to allow the axletree to move out of its parallelism with the other axletree in order to accommodate it to the curves of the road."

[Printed, 10d. Drawings. See *Inventors' Advocate*, vol. 1, p. 147.]

A.D. 1839, August 16.—N° 8197.

ADAMS, WILLIAM BRIDGES, and BUCHANAN, JOHN.—

"Certain improvements in the construction of wheel carriages, parts of which improvements are also applicable to machinery for propelling, and also for the purpose of securing ships and other vessels, and for communicating motion between different portions of machinery."

One part of this invention consists in a new mode of applying springs for the suspension of the bodies of carriages. According to one arrangement a "longitudinal extension spring" is used, such a spring "being made of a flat bar or blade of steel or any other suitable material," "the form being in all cases a curved or bended line," and "the weight or force which the bearing springs have to sustain being applied solely at the two ends of the curve of each spring, and acting in the direction of an imaginary straight line between the two ends of such spring."

This part of the invention is described under various modifications, and the patentees include in their claims for invention not only the application of the extension spring mentioned above, but also the combination therewith of certain "jointed levers;" "extension and compression springs;" "twisted blade springs;" "sword blade springs;" "C-bow springs;" "sugar-tongs springs;" and "shifting fulcrum springs;" the latter being applicable not only as bearing but also as traction and buffing springs. Further, the invention includes the application of springs to "vertebrated carriages," such as those described in the Specification of the Patent granted to the present patentee on the 20th of October 1836, the object of this part of the invention being to partly

counteract the flexibility of the carriages. Also a mode of enabling "jointed bodied carriages" "to lock or turn about," this facilitating the transfer of such carriages from one line of rails to another.

Also a mode of constructing wheels for railway and other carriages, the flanges of such wheels, when required, being "bolted on laterally." Also a mode of applying extension and compression springs as brakes or friction clogs for retarding the wheels of carriages on common roads; drags for pinching the rails of railways; a mode of lubricating axles through the medium of a piece of sponge; a mode of constructing the axles and boxes of carriage wheels, "with sliding collars for the boxes" "retained in place by springs;" a mode of applying the bodies of carriages upon cranked axles, or axles having cranked arms descending from them, "so that the weight of the body will hang" "pendulum fashion on the lower part of the crank, on joint pins" "at the lower ends of the descending crank arms;" also a mode of "causing a double seated body for a two wheeled carriage to" "accommodate itself in its position over the axles of the wheels," "suitably for balancing the weight when the front seat alone" "is occupied, or when both hind and front seats are occupied." Also a mode of constructing the bodies of railway carriages "with boards suitably united and combined, but without framing and panelling;" and likewise certain modes of "constructing such cranked axles for carriages as are made of" "wood and iron combined, such combined cranked axles" forming part of the invention which was secured by the Patent already mentioned, this part of the present improvements "being confined" "to the disposition of the iron plates flatways, upwards, above," "and below the wood," and also including a mode of applying a wooden bed to give strength to a cranked axle. All these particulars are set forth at some length, and illustrated by drawings containing a large number of figures.

[Printed, 1s. 8d. Drawings. See *Mechanics' Magazine*, vol. 32., p. 463; and *Inventors' Advocate*, vol. 2, p. 163.]

A.D. 1839, August 17.—N° 8200.

KOLLMAN, GEORGE AUGUSTUS.—"Improvements in railways, and in locomotive and other carriages."

One part of this invention relates "to the mode of constructing" "locomotive and other carriages to run on railways and on roads,"

" in order to their being adapted more advantageously to run in  
" curved directions."

The framing of the carriage (or engine) is composed of two separate upper and lower frames connected by uprights; these frames in fact forming cages, placed one behind the other, within which the boiler and engine or body of the carriage may be suspended by means of springs connected to the upper frames, and suitable sliding guides descending to the axletrees of the wheels on which the carriage or engine is supported, these axles, however, being short axles working in bearings in the sides of the frames, and not passing across them.

The two frames are connected by other frames called "perch  
" frames," necks or axes on the former entering openings in the latter, and the perch frames being themselves united by rods in such manner as to admit of the two parts of the apparatus adapting themselves to curves in the rails, there being between the main lines of rails a guiding rail, against the opposite sides of which guide wheels work, which are mounted on vertical axes under the frames. If desired, however, these guide wheels may work against the sides of the rails themselves, or such guide wheels may run in a trough placed below the surface of the ground between the rails. This part of the invention is set forth as an improvement upon that for which a patent was granted to the present patentee on the 23rd of April, 1836.

In another arrangement breaks for a carriage are each composed of a "strong bow," between the ends of which a strong belt of leather or other suitable fabric is stretched, these breaks being pressed against the wheels of the carriage by turning a handle fixed on an upright shaft, which, by means of suitable gearing, gives motion to a horizontal pinion placed between rack bars, and causes these bars to actuate arms lying across the framing of the carriage and having the breaks attached to them. Such breaks may vary in number and arrangement.

In another arrangement a cross bar connected to the rods of the buffers in front of the carriage has attached to it a rod which inclines downwards, or as to point towards the centres of the wheels farthest from these buffers, the lower end of this rod being forked, and embracing a curved spring united to another cross bar carrying breaks which may be similar to those last described, or may consist of boxes or segments lined with wood, the result of this arrangement being that on the buffers being acted upon the

breaks are forced against the wheels. Such an arrangement may be applied at each end of the carriage, each arrangement operating upon one pair of breaks, but the whole of the breaks may be brought into action by means of certain rods jointed to the cross bars, and a chain connected to a pulley which may be turned by a handle and a shaft connected with certain gearing.

In another arrangement, very similar to that last described, breaks are applied "to the outside or in front of the nearest wheels" instead of to the inside of the farthest wheels from the buffers, the inclined rods being much shorter than in that arrangement. These breaks may be used as "manual" breaks, and the springs connected to the cross bars under the carriage may also be made to act as traction springs.

Another part of the invention consists in applying at the inclined parts of a railway wooden rails composed of "a series of" blocks, side by side, with their grain upwards, which are somewhat higher than the iron rails on which the wheels of the locomotive carriages run at other or level parts of the railway. "These additional rails are side by side with the iron rails, and are bolted or otherwise fixed in such places as there is an inclined plane to be ascended," the driving wheels of the locomotive carriage being constructed "of two diameters, the larger diameter running on the iron rails of the railway, and the smaller diameter, when the carriage comes to an inclined plane running on the extra wooden rails, and for the time being carrying the locomotive carriage, and the periphery or surface of the smaller diameter of each of the wheels is roughed in order that their holding on the extra wooden rails may be the more effectual."

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 18 (*conjoined series*), p. 370; *Inventors' Advocate*, vol. 2, p. 179; *Engineers and Architects' Journal*, vol. 8, p. 72.]

A.D. 1839, September 16.—N° 8219.

DODDS, ISAAC, and OWEN, WILLIAM.—"Certain improvements applicable to railways, and in the construction and manufacture of wheels, engines, and machinery to be used thereon; part or parts of which are applicable to other engines, and which wheels without a flange are also applicable for use on turnpike roads."

The improved wheels "are to be made principally, if not entirely of wrought iron." A long bar is forme by rolling or other-



wise, and is made smooth on the upper surface, but has certain indentations and recesses on the under surface for the reception of peculiarly formed spokes. The bar is to be cut into suitable lengths or pieces, and two of the spokes are to be welded to each piece. When that has been done, each piece of the bar is to be bent into the form of a segment of the felloe, and the spokes set truly in radial directions; so many of these portions of the bar and spokes as will constitute an entire wheel are then put together in a mould, and the nave or box of the wheel cast on to the inner ends of the spokes. The wheel having been thus formed, the junctions between the pieces or portions of the felloe are then to be welded together, and the wheel is complete, or the welding or uniting of the portions of the felloe may be done before the nave or box is cast on to it. "If it should be necessary to put a tire upon this wheel, that may be done by rolling a long bar in the ordinary way, with such a flange, if required, as will suit the particular railway on which it is to be used. And when this tire bar has been bended and welded into a correct circular form, the tire hoop so made must be heated and then shrunk on to the felloe of the wheel, and it may be further secured by one or more small studs on the inside of the tire let into the outer periphery of the felloe. In order to give greater security to the tire so attached, it may be of advantage to turn the outer periphery of the felloe to a slightly bevilled form, and to roll or turn the tire iron to a corresponding bevel with a shoulder," when "the tire being then shrunk on, it will be impossible for it to be loosened from its place by any vibratory action when in use." This wheel is furnished with two sets of spokes, placed parallel with each other.

In another mode of forming a wheel the spokes are first tapered at one end and enlarged at the other, the tapered ends being then welded to three collars or rings which furnish a nave for the wheel, one of these being between the spokes and one on each side of them. A double set of spokes being thus formed, the latter are then bent so as to bring the outer ends of each pair together, these being then connected to certain "snugs" or projections formed in the interior of a circular tyre which has previously been prepared, and between which snugs the ends of the spokes are secured by keys, and, if desirable, by punching the snugs into recesses in the ends of the spokes. This arrangement may be varied by forming each pair of spokes from one piece of



metal, and welding the spokes to the tyre, thus dispensing with the use of keys, wedges being sometimes used in welding the spokes to the tyre, so as to give greater solidity to the wheel, or the tyre and spokes being so adapted to each other that wedges will not be needed. A nave may also be formed of a grooved bar bent into a cylindrical form, the ends of the spokes being inserted into the groove, the latter being wider at the bottom than at the top, and the ends of the spokes of corresponding figure, and united to the nave by welding. One spoke may be passed farther into the nave than the rest, to prevent them from slipping round in the groove, or such slipping may be prevented by a bolt passing through the nave.

A multitude of other modifications of this part of the invention are described, the nave being in some cases of one piece of metal having a single flange on one side, against which the spokes are firmly held by a ring shrunk on the other, the outer ends of the spokes passing through mortice holes in a felloe, and being welded thereto, and a tire afterwards shrunk on the felloe. In other cases the wheel is composed of segment pieces, formed with flanges at the ends to facilitate the attachment of them to the nave and felloe, which attachment again may be produced in different ways. The nave in some cases may be formed of a bent flanged piece of metal, not welded at the joint, but a ring or hoop being shrunk upon the flanges of the inner ends of the segment pieces after they are placed around it, the felloe being composed of a ring, furnished with notches for the reception of the flanges of the outer ends, and a tyre being afterwards shrunk on around the whole. Or the nave may be grooved for the reception of the flanges of the inner edges of the segments, which are secured therein by a hoop, the flanges of the outer ends of the segments being also grooved for the reception of a rib on the inside of the tyre. A nave may also be formed of four segmental blocks "put together but not attached," and expanded by keys after the segmental pieces have been placed around it, and the felloe around them, rings being afterwards shrunk on the nave, and a tyre around the felloe, this tyre being further secured if desirable by bolts and rivets. A nave of cylindrical form is also described as having a rib around it against which the segmental plates are secured by rings, the outer ends of the plates being inserted into grooves formed in the felloe, which is heated and shrunk on to them, bolts and sockets here supporting and securing the sides of

the plates. A nave may also be formed of metal cast upon the inner ends of the segmental pieces.

An improved mode of forming cranks and crank axles is described, in which the patentees, in order "to produce great strength and a more perfect tenacity of the iron, as well as facility of manufacture," "cut out from plates of iron, by a stamping press or other convenient means, any number of pieces to the form or figure of the article wanted, and then, having combined these pieces, weld them all together into a solid mass."

A mode of connecting carriages to each other is also described, in which a connecting rod projecting from one carriage is jointed to a lug at the back of a box, in the front of which there is an opening, into which may be inserted the socket of a tumbler, carried by the connecting rod of the next carriage, a shaft passing through the box carrying a key which enters the tumbler, and on the shaft being turned partially round locks the whole together. This shaft is turned by hand in producing the ordinary connection and disconnection of the carriages, but is furnished with levers provided with curved arms, which, upon a carriage turning sideways and leaving the rails, are acted upon by a curved plate, and the carriage remaining on the rails disconnected from the first by the moving of the shaft, key, and tumbler.

Another part of the invention consists in the employment of buffer springs, which are composed of "helical or coiled springs of wire of much less strength than are ordinarily used," but a greater number being applied to each buffer, such springs, moreover, being of "different lengths or degrees of inclination or coil," and "abutting upon different steps or stages in the extreme ends or parts of the buffers;" springs of different elastic force thus acting in conjunction at one time, and this arrangement producing a more "sensitive elasticity" in the buffer than can be produced by springs which are all of the same or nearly the same power, such as customarily employed. Such springs may be made to act not only as buffer, but as traction springs.

Another part of the invention relates to the springs of engines and carriages. The axle of the engine or carriage is mounted in bearings in a "slider" or small frame, capable of moving up and down below the main frame of the carriage or engine, and a number of helical springs are placed between the top of the slider

and the under side of the main frame. These springs are of "different elasticity," and serve to neutralize the effect of variation in the weight of the carriage or engine, or of inequalities in the level of the rails, while other springs (which may be either helical or flat) are made to press against the bearings of the ends of the axle, which are capable of lateral movement; this part of the arrangement preventing any lateral motion of the wheels or axles from being directly communicated to the carriage or engine.

[Printed, 3s. Drawings. See *Inventors' Advocate*, vol. 2, p. 22.]

A.D. 1839, October 17.—N<sup>o</sup> 8243.

HADDAN, JOHN COOPE, and HAWKS, GEORGE.—"Certain improvements in the construction of wheels for carriages to be used on railways."

According to one part of the invention the spokes of wheels are composed of bars of iron, each of which is so bent as to form a figure resembling a pentagon, the sides, however, not being all equal. These bars are so arranged that one of the angles of each pentagon, beyond which the ends of the bars project, is inwards, and a nave of metal is then cast thereon, while around the sides of the pentagons opposite to such angles are placed an inner ring and an outer tyre, both being shrunk upon the spokes, and a bolt or rivet connecting the inner ring with each alternate spoke, while the rest are bolted or rivetted to both ring and tyre, the intermediate angles of the spokes being in contact with each other, and if elasticity in the spokes is desired, some portions of them being slightly curved, and this being always the case with that side of each spoke next the ring, in order to adapt it thereto. The patentees describe a wheel as having eight spokes, but state that for "five-foot wheels" they prefer twelve spokes, the ends of the bars in this case extending farther beyond what may be termed the pentagonal part of the spoke, and being again bent so as to first recede from and then approach each other.

Another mode of forming a wheel is described, in which the spokes are composed of flat bars, of which the outer ends are bent in one direction, and the inner ends in the other, the bent parts of the outer ends being placed in a groove formed on the outside of a ring or felloe, through holes in which the bars are passed, and such bent parts pointing in opposite directions, the bars themselves being here in contact, while the inner bent por-

tions have a nave cast upon them, the bars being here some distance asunder, and the whole being secured by an outer tyre. Spokes are also described as being formed of a single bar of metal, having a "double head or bend" at the outer end, and being placed "at an angle of forty-five degrees with the plane of the wheel," the patentees further stating that "single or compound spokes, having bended or forged heads, may be placed through holes cut across or in the same direction as the groove" formed in the ring of the wheel.

Another wheel is described in which a tyre having an inner rib is first formed, and holes then made in the rib, through which heated bars are passed for half their length, and then bent so as to bring the ends sufficiently near together for a nave to be cast upon them, the ends, however, being first so acted upon that the two parts of the bar (which now form a compound spoke) are "inclined edgewise in opposite directions," so as to be from half an inch to an inch "out of perpendicular to the nave." Single spokes may be formed by bars bent at the end so as to enter the holes in the tyre, where they are secured by riveting or hammering while in a hot state; and one half of the spokes having the bent portions pointing in the contrary direction to those of the others.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 11 (*enlarged series*), p. 120; London Journal (*Newton's*), vol. 24 (*conjoined series*), p. 170, and vol. 31 (*conjoined series*), p. 365; Inventors' Advocate, vol. 2, p. 260; Patent Journal, vol. 3, p. 603; Simon's Reports, vol. 16, p. 43; Law Journal (*Chancery*), vol. 17 (*new series*), p. 43; Law Times, vol. 10, p. 154.]

A.D. 1839, December 4.—N<sup>o</sup> 8299.

NASMYTH, JAMES. — "Certain improvements applicable to railway carriages."

This invention consists in the adaptation of certain mechanism or apparatus to railway carriages, whereby a train of such carriages may be "made to stop, or is assisted in stopping itself by means" and through the agency of its own velocity," this being so accomplished "that in exact proportion to the velocity and weight" of the moving train of carriages is the amount of the stopping "or retarding agency;" and this being placed "so entirely under the command of the engine man, or his assistant, that he is" able at all times to convert the momentum of the train of carriages into the agent whereby that momentum is absorbed or "destroyed, thus bringing the whole train from a state of high

“ velocity to a state of perfect rest, with a much greater rapidity of transition than has hitherto been done.”

The invention is described at some length, but consists in reality in a mode of causing the buffers to act upon the breaks of the carriages, when a retardation of the engine and tender takes place. Thus on its being desired to stop the train, the steam having been first shut off, the breaks are applied to the wheels of the tender, the momentum of the carriages then causing the buffers of the carriages to be brought into action, and the rods of such buffers to operate, through the medium of rack bars and catches, upon elastic levers, which, through the medium of other levers and rods, press the breaks upon the wheels. In order, however, that this effect may not be produced, except when desirable, the catches are so arranged as only to be acted upon by the rack bars upon the tightening of a cord or chain, which extends from a drum or roller on the tender below the whole length of the train, and is tightened by moving the lever, so as to cause the roller to come into contact with one of the wheels of the tender; this tightening of the cord or chain placing the catches in gear with the teeth of the racks. Other means of tightening the cord or chain may, however, be employed.

[Printed, 6d. Drawing. See *Inventors' Advocate*, vol. 2, p. 372.]

A.D. 1840, March 3.—N° 8410.

**RANGELEY, JOHN.**—“Improvements in the construction of railways, and in the means of applying power to propelling carriages and machinery.”

These improvements relate “to a mode of constructing railways in such a manner that the power employed for propelling carriages thereon is caused to be transmitted by a series or train of wheels moving on axles supported on stationary bearings fixed in the line of railway, and in such manner that the carriages for passengers and goods are caused to pass over and be acted on and moved by the rotary motion of such wheels, by the contact and friction of their peripheries acting against the under sides of a pair of running rails attached to each carriage. The carriages are themselves without bearing wheels, the running rails,” which are in fact short rails attached to them, entirely supporting them, but they are furnished with guide wheels, working horizontally against the inner sides of the inner

line of fixed rails (these being double) and so preventing them from leaving the proper track. And they are also provided with breaks, which by means of levers and screws can be pressed down upon the inner rails. The axles of the wheels which move the carriages have also pulleys upon them for the reception of bands, straps, or chains, by which the wheels are actuated from a suitable prime mover. The details of the invention may be varied.

[Printed, 1s. Drawing. See *Engineers and Architects' Journal*, vol. 3, pp. 322 and 373; *Inventors' Advocate*, vol. 3, p. 162.]

A.D. 1840, May 5.—No 8495.

**HILLS, FRANK.**—"Certain improvements in the construction of steam boilers and engines, and of locomotive carriages."

One part of this invention consists in "the construction of wheels with wooden felloes inserted between two vertical wrought iron rings, to which rings the spokes are attached." Each ring has a set of seven spokes, the inner ends of all the latter being enclosed within a nave or centre which is cast upon them, and the outside of the wooden felloe is surrounded by an iron ring. Another improvement in wheels consists "in employing a second tire composed of segments of cast steel or other suitable metal, attached by bolts to the first or permanent tire, to admit of being replaced with facility when they become worn." Two improvements on axletrees for locomotive engines are described. One of these consists in "the employment of a stationary axis, with hollow arms, upon which the wheels revolve, and through which arms the driving shaft, which transmits the power of the cranks to the wheels, passes." The second improvement, "which is also applicable to the bearings of the other parts of the machinery of locomotives, consists of an arrangement for making the bearings run in a flood of oil." Instead of making the bearing part smaller than the other part of the axle or shaft, it is made larger by shrinking on the shaft a steel collar, which collar runs in a corresponding groove in the brass or bearing; a cavity being also formed on the lower brass, to contain a supply of oil, and such cavity communicating with the groove in which the collar runs by an aperture. The other parts of the invention do not require notice here.

[Printed, 1s. Drawings. See *Mechanics' Magazine*, vol. 23, p. 494, and vol. 35, p. 145; *Inventors' Advocate*, vol. 3, p. 306; *Engineers and Architects' Journal*, vol. 4, p. 28.]

A.D. 1840, May 7.—N° 8499.

**GROVER, HENRY MONTAGUE.**—"An improved method of  
"retarding and stopping railway trains."

This invention consists "in the application of the powers of an  
"electro-magnet, or of electro-magnets, or of magnetism generally,  
"whether applied directly or indirectly to any wheel or wheels  
"upon which a train or any portion of a train of carriages or  
"other vehicles upon any railway moves or in any other manner,"  
for the purpose of retarding or stopping such carriages when  
requisite.

Various modes of carrying out the invention may be adopted,  
but an arrangement is described in which an electro-magnet of the  
ordinary horse-shoe form is placed within a wooden block or box  
suspended near one of the wheels of a railway truck, a galvanic  
battery being placed on the platform or bed of the truck, and  
wires passing therefrom to the coils of the electro-magnet, the  
result being that on due connection between the wires and the  
battery being established the electro-magnet is attracted towards  
the wheel, and presses the wooden block or box against it. This  
arrangement may be varied by causing the electro-magnetic power  
to act upon a break through the medium of levers, or other ma-  
chinery, and such breaks may be applied to either one or all of  
the wheels of a carriage.

[Printed, 6d. Drawing. See *Mechanics' Magazine*, vol. 23, p. 479; *In-  
ventors' Advocate*, vol. 3, p. 307; *Engineers and Architects' Journal*, vol. 3,  
p. 429.]

A.D. 1840, May 12.—N° 8504.

**DIRCKS, HENRY.**—"Certain improvements in the construction  
"of locomotive steam engines, and in wheels to be used on rail  
"and other ways, part of which improvements are applicable to  
"steam engines generally."

The improvements in the construction of railway wheels "con-  
"sist in forming the tyre of the wheel of cast or wrought-iron,  
"having a channel or groove formed in it to be filled with blocks  
"of wood, having the grain of the wood placed vertically or end-  
"ways all round in segments, which are afterwards bolted or  
"riveted, or otherwise fastened in the channel of the tyre, and  
"present a wooden-faced rim or running surface to the road or  
"way." The wood preferred for this purpose is "African oak,



" British oak, beech, or other hard wood, previously soaked or  
 " saturated with coal-gas tar, and impregnated therewith by  
 " means of hydraulic or other pressure, in order to fill up its pores,  
 " and thus prevent the admission of moisture," but other woods,  
 compressed or otherwise suitably prepared, may be used.

One mode of securing the segments of wood in the channel of  
 the tyre is mentioned in which a groove is formed " half in the metal  
 " and half in the wood," melted metal being then run into this  
 channel.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 17 (*new series*), p. 18;  
 London Journal (*Newton's*), vol. 18 (*conjoined series*), p. 226; Mechanics'  
 Magazine, vol. 23, p. 501; Inventors' Advocate, vol. 3, p. 224; Engineers  
 and Architects' Journal, vol. 3, p. 401.]

A. D. 1840, May 28.—N<sup>o</sup> 8520.

GOOCH, DANIEL.—" Certain improvements in wheels and loco-  
 " motive engines to be used on railways."

This invention consists, " forming the outer or working sur-  
 " face of the tire of engine and carriage wheels of steel, which  
 " may be made of any required degree of hardness." Steel  
 of any kind or quality may be used in forming the tyre, but the  
 best blister, rolled, shear, or cast steel is preferred. It is also pro-  
 posed to use iron, unconverted, in forming the outer tyre (with  
 its surface across the grain of the metal), and to convert it wholly  
 or partially into steel when in the form of a tyre by the usual  
 process of making steel, sufficient thickness and width being  
 left previous to converting, so as to allow of its afterwards being  
 well hammered.

A mode of carrying out the invention is described in which a  
 " faggot" of wrought-iron bars is hammered or rolled into a solid  
 bar and a flanch formed thereon. An indentation is then formed  
 in the bar in order to prepare it for being united with an exterior  
 surface of steel, which is composed of a " faggot" of steel bars, so  
 piled that when hammered together " their edges form the broad  
 " surface of the solid steel bar across the grain of the metal," the  
 two bars being then welded together, and the compound bar thus  
 formed being then converted into a hoop, which may be fixed on  
 the outside of a wheel by ordinary means, being placed thereon in  
 a heated state, and the whole being then plunged into cold water  
 " or other frigerific mixture" in order to " contract the tire on  
 " the wheel and harden the steel;" the tyre being then, if desir-  
 able, further secured by rivets.

By a disclaimer and memorandum of alteration enrolled on the 9th of September, 1842, the Patentee removed from the title of this Patent the words "and locomotive engines;" and by a second disclaimer and memorandum of alteration enrolled on the 11th of December, 1844, he disclaimed the mode described of hardening the tyre, as also "the use of steel in the tires of engine " and carriage wheels for railways," and made some verbal alterations in the Specification, the effect of the whole being to confine his claim to the method described of "forming" steeled tyres for railway wheels.

[Printed, &c. Drawing. See Repertory of Arts, vol. 15 (*new series*), p. 286; London Journal (*Newton's*), vol. 18 (*conjoined series*), p. 84, and vol. 22, p. 368; Mechanics' Magazine, vol. 33, p. 538; Inventors' Advocate, vol. 3, p. 257; Record of Patent Inventions, vol. 1, p. 169; Engineers and Architects' Journal, vol. 4, p. 29 (with two Disclaimers).]

A.D. 1840, May 28.—N° 8521.

SMITH, WILLIAM HENRY.—"An improvement or improvements in the mode of resisting shocks to railway carriages and trains; also in the mode of connecting and disconnecting railway carriages; also in the application of springs to carriages."

The invention consists in the first place, "in applying to the carriages certain combinations of machinery or apparatus, affording an increased length of elastic resisting power with a consolidated action of the same, calculated to obviate the present liability to danger."

One mode of carrying out this part of the invention consists in applying beneath one of the carriages of a train an apparatus consisting of a set of helical or other springs of considerable length, so arranged as to be acted upon simultaneously by one buffer bar furnished with a cross bar, this buffing bar "extending the whole length of the train, and projecting a certain distance (say five feet) beyond the carriage at each extremity." The buffer bar is furnished with joints in order to facilitate the connection and disconnection of the carriages, and the carriage at each end of a train may, if desirable, be furnished with a set of springs and a cross bar. Another mode of carrying out this part of the invention consists in the employment of a screw, mounted at one end of a buffer bar, and passed through a collar or nut, the screw having the thread of such pitch and "angle" that in the event of collision it works forward in the collar, the resistance thus created to

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The invention consists in the first place, "in applying to the carriages certain combinations of machinery or apparatus, affording an increased length of elastic resisting power with a consolidated action of the same, calculated to obviate the present liability to danger."

One mode of carrying out this part of the invention consists in applying beneath one of the carriages of a train an apparatus consisting of a set of helical or other springs of considerable length, so arranged as to be acted upon simultaneously by one buffer bar furnished with a cross bar, this buffing bar "extending the whole length of the train, and projecting a certain distance (say five feet) beyond the carriage at each extremity." The buffer bar is furnished with joints in order to facilitate the connection and disconnection of the carriages, and the carriage at each end of a train may, if desirable, be furnished with a set of springs and a cross bar. Another mode of carrying out this part of the invention consists in the employment of a screw, mounted at one end of a buffer bar, and passed through a collar or nut, the screw having the thread of such pitch and "angle" that in the event of collision it works forward in the collar, the resistance thus created to

A.D. 1840, September 24.—N° 8644.

PINKUS, HENRY.—“Improvements in the methods of applying motive power to the impelling of machinery; applicable, amongst other things, to impelling carriages on railways, on common roads or ways, and through fields and vessels afloat, and in the methods of constructing the roads or ways on which carriages may be impelled or propelled.”

This invention is described at considerable length, and is illustrated by a large number of drawings. The only part of the invention which requires notice here, however, consists in a mode of applying “electric influence to breaks connected with locomotive or other vehicles on railways.”

In order to effect this certain additional rails are laid down between the ordinary rails of a railway, these additional rails being in “half-mile lengths,” and being hollow for the reception of insulated wires or rods, capable of communicating with an electro-galvanic battery, such a battery being provided, if necessary, for each length or “section” of such rails, and the latter carrying on their upper surfaces bars of wood, on which are fastened copper rods or wires, through which, by means of the battery and wires, an electric current may be caused to pass. Suspended below the engine (for example) are copper rods or conductors, to which are connected two masses of copper attached to a wooden block, these masses of copper sliding upon the copper wires or bars fixed on the wooden rail, and forming what the patentee terms “an electro-magnetic coupler;” copper wires proceeding from the conductors to an electro-magnetic engine on the locomotive engine; the result being that on an electro-magnetic current being induced in the copper bars on the wooden rail, the coupler, conductors, and wires connected therewith communicate its influence to the electro-magnetic engine, and so cause a flexible armature, or flexible armatures, connected with the levers for turning the breaks to press the latter against the wheels of the locomotive engine. The electro-magnetic engine is a rotary one, and is made to turn a pulley, and, by means of a wire or cord passing therefrom, act both upon the throttle valve of the locomotive and the whistle, simultaneously with the putting on of the breaks.

These arrangements may be varied. Thus the electro-magnetic engine may be placed upon one of the carriages of the train,

instead of upon the locomotive engine. And a battery may be carried by the train itself, by which the conductors of the train may not only bring into action the breaks and throttle valve and whistle of the engine, as well as the breaks of the carriages of that train, but also those of other trains, which may be either before or behind it. The electro-magnetic engine may be either such as already known, and called "Taylor's rotary," or made according to a method described by the patentee, in which rotary motion is given to a shaft from a reciprocating beam, by means of a connecting rod and crank.

The details of these arrangements are described in a very disjointed and unsatisfactory manner, the references to the drawings being, moreover, very irregular.

[Printed, 6s. 8d. Drawings. See *Mechanics' Magazine*, vol. 34, p. 299; *Inventors' Advocate*, vol. 4, p. 212; *Engineers and Architects' Journal*, vol. 4, p. 174.]

A.D. 1840, October 15.—N° 8659.

PETTIT, ROBERT.—"Improvements in railroads, and in the carriages and wheels employed thereon."

In describing the improvements in railway wheels, the patentee says:—"The flanges of the ordinary railway wheel are used for the purpose of keeping the carriages in their proper position on the rails, but I effect this object in a different manner; instead of flanges, I employ four or more horizontal wheels," "mounted on vertical axles underneath the carriage, and to prevent their rattling against the rails, I insert into a groove round the periphery of each wheel rope yarn, or other soft substances;" these wheels "bear against the inner side of the parallel rails, and by revolving freely on their axes keep the carriage in its proper position on the line of railway."

He then describes a mode of applying breaks to the wheels of railway carriages. Above the top of the carriage extends a horizontal bar, to which are jointed or connected vertical levers, at the lower ends of which are horizontal rods connected to breaks placed below wheels fixed on the same axes, but being smaller than the wheels of the carriage, other breaks, placed above these smaller wheels, being connected to the lower breaks by other levers, the effect of the whole arrangement being that on moving the horizontal bar above the carriage, which is effected by means of a screw, the vertical levers first mentioned bring the lower



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breaks into action by moving them horizontally, and these, being thus slightly depressed, pull down the upper breaks also into contact with the wheels, two breaks being thus caused to act simultaneously upon each wheel.

Another part of the invention consists of a moveable "switch" or bar, for the purpose of directing carriages, when necessary, from one line of rails to another branching therefrom, this switch being composed of a single bar, mounted upon a fulcrum at one end, and having a lever connected to the other, by which it may be moved to and fro, and acting upon the carriages through the medium of central guide wheels with which they are furnished. The carriage of the engine has in front two horizontal guide wheels, and two small running wheels, mounted in bearings attached to a framework projecting from the axles of the front bearing wheels of the engine, these axles being "allowed a little play," so that when the guide wheels arrive at a curve or branch in the line, the front wheels of the engine "may be allowed to edge round a little." Carriages may also be furnished with such apparatus.

A mode of connecting carriages together is also described, in which a central carriage is supported by one in front of and one behind it. The wheels of the front and hinder carriages are mounted upon axles connected to vertical frames, which pass entirely around the bodies of the carriages, and within which the latter are suspended, the central carriage being suspended from bars resting upon the frames of the others, such central carriage being, however, provided with small wheels, which, if the bars should bend from excess of weight, will touch the rails and aid in supporting the carriage.

Apparatus for stopping a train by persons not travelling thereby is also described, in which the engine is furnished with a short horizontal lever connected with a pulley, to which are attached two cords or straps. When it is desired to stop the train a certain double inclined plane, mounted on the top of a column stationed near the railway, is placed in such a position that the end of the lever comes into contact with it, and the pulley then causes one of the cords to act upon a cock, by which the supply of steam to the cylinders of the engine is stopped, and the whistle sounded, the other cord putting in action certain apparatus, by which two "doors" in the front part of the engine are caused to fly open and cause resistance to the motion of the engine by

exposing a large surface to the atmosphere; another cord being, if desirable, made to bring a break into action upon the wheels. Each carriage is also provided with a similar lever, which by coming into contact with the incline removes a pin from beneath a cross bar connected to certain long levers, from which are suspended rods carrying breaks, the result being that the levers fall into such a position as to press the breaks upon friction wheels connected with the carriage wheels. The long levers may, if desirable, be furnished with weights, to increase their effect upon the breaks, and they are restored into their first positions by the use of certain pulleys and cords. Another arrangement is described in which the engine carries a vertical spindle, at the upper end of which is a lever connected by one chain or rod to the handle of the steam regulator, and by another chain or rod to the handle of the whistle, these chains or rods, however, not interfering with the ordinary action of those parts. At the lower end of the spindle is another lever provided with a stud pointing downwards, and higher up on the spindle is a stud which sustains the loaded end of a long weighted lever, the other end of which is fixed upon a spindle carrying a short cross lever, capable of acting upon breaks placed near two of the wheels of the engine. At such parts of the line as may be deemed most proper for the purpose, apparatus is placed, which consists principally of a sort of sliding carriage, which can be moved to and fro upon sleepers by means of a rod and handle, and carries with it the inner ends of two long pieces of angle or other iron mounted on fulcra at their other ends on other sleepers, the effect being that when the inner ends of these pieces are thrust forward, the two pieces form a double inclined plane, which will act upon the lever on the lower end of the spindle mentioned above, and, by turning that spindle partially round, cause the lever at the top of the spindle to both shut off the steam from the cylinders of the engine and direct it to the whistle, and also liberate the weighted break lever, thus allowing it to bring the breaks into action.

[Printed, 1s. 6d. Drawings. See *Mechanics' Magazine*, vol. 34, pp. 321 and 330; *Inventors' Advocate*, vol. 4, pp. 262 and 330; *Engineers and Architects' Journal*, vol. 4, p. 159.]

A.D. 1840, November 2.—N° 8673.

BOYDELL, JAMES, junior.—“Improvements in working railway and other carriages in order to stop them, and also to prevent their running off the rails.”

This invention relates, "first, to the application of apparatus acting by lever pressure on the rails, and thus offering retarding means to stop railway and locomotive carriages, trucks, and other carriages on railways." A lever is mounted upon an axis carried by a bracket projecting below the engine or carriage, the lower end of the lever being formed so as to embrace the rail, and lined (by preference) with wood, the upper end of the lever being connected by means of a link to a long lever, by means of which the lower end of the first lever may be pressed downwards on the rail.

Another part of the invention consists in connecting carriages and trucks by means of bars crossing each other diagonally beneath them, the ends of the bars of one carriage being connected to those of the next by pivots or pins, and the central parts of the bars being slotted for the reception of pins fixed in the framing of the carriage, these slots allowing the carriages to assume different angles with each other in passing round curves, but the bars otherwise serving to keep the carriages together on the rails.

[Printed, *full Drawing*. See Repertory of Arts, vol. 15 (*unic arries*), p. 332; Mechanics' Magazine, vol. 34, p. 353; Inventors' Advocate, vol. 4, p. 203; Engineers and Architects' Journal, vol. 4, p. 207.]

A.D. 1840, November 12.—N<sup>o</sup> 8699.

BIRCH, EUGENIUS.—"Improvements applicable to railroads, and to the engines and carriages to be worked thereon."

According to this invention the steam may be partially or wholly shut off from the engine of a locomotive, the whistle sounded, lights shown, and breaks applied both to the wheels of the locomotive and of carriages drawn thereby, independently of the persons who may be travelling therein, as well as by such persons.

One arrangement is described in which a locomotive engine is provided at one side with a vertical spindle or shaft, at the lower end of which is a lever projecting outwards, and furnished with an antifricition roller, while at the top of the spindle is another lever connected by a pin joint with a lever fixed on the spindle of the valve which regulates the passage of the steam from the boiler to the engines. Placed near the line of rails, at such points as may seem desirable, are pieces of mechanism capable of acting upon the lever at the lower end of the vertical spindle, and so either partially or wholly closing the valve. Such mechanism may either be fixed and permanent, so as to act upon every pass-

ing train at such points as curves or inclines in the rails or the approaches to stations, or it may be moveable, and only brought into action in case of necessity. It may consist, for example, of two bars so arranged as to form a fixed double inclined plane, having curved springs at the outer ends, and being jointed together in the middle, the springs preventing any shock being given to the parts when the antifriction roller comes into contact with the apparatus; or such bars may be mounted on pivots, and a rod connected to them by which they may be moved through the medium of an eccentric and handle fixed upon an upright axis. Besides closing the steam valve, the lever at the top of the vertical spindle on the engine may, by means of a connecting rod, be made to open the plug of the steam whistle, a cog wheel on the spindle at the same time operating upon a pinion fixed on the stem of a lamp, and by turning the latter bringing a light into view.

These arrangements may be varied. Thus the apparatus may be contrived so as to shut off the steam, sound the whistle, and turn the lamp separately, the mechanism near the line being contrived so as to act either upon one or the other at pleasure. And, by means of a lever which may be acted upon by a person in a passing train, apparatus near the line may be placed in position for acting upon the following train, should the first be behind time and there be danger of a collision; various modifications of these arrangements being described, in some cases inclined bars, and in other cases "uprights" being placed near the rails.

An arrangement is also described in which a vertical spindle mounted on the engine has upon it a projection which, when the carriage to which such train belongs is travelling in the ordinary manner, supports one end of a bent lever, the other end of which is capable of putting into gear a pair of clutch boxes mounted on one of the axles of the carriage, there being a pulley connected to one part of this clutch box, loose on the axle, from which a crossed strap proceeds to another pulley fast on the other axle of the carriage, this driving the first pulley in the contrary direction to the first axle. The result of this arrangement is that on the vertical spindle being turned by means such as those already described the projection thereon leaves the lever at liberty, and a spring pressing against the latter then causes it to place the clutch boxes in gear, giving motion to the pulley on the first axle in the same direction as that of the latter, and causing the crossed

strap now to tend to turn the other axle and wheels thereon in the contrary direction to that in which they had previously revolved, producing an effect which acts as a break to the movement of the carriage. In another arrangement the releasing of a weighted lever from the projection on the vertical spindle is made to press breaks of the ordinary character against the wheels of the carriage.

[Printed, 1s. 6d. Drawings. See *Mechanics' Magazine*, vol. 34, p. 309; *Inventors' Advocate*, vol. 4, p. 324.]

A.D. 1840, November 24.—N° 8712.

POPE, FRANCIS.—“Improvements in detaching locomotive and “other carriages.”

This invention is described in the first place with reference to releasing a horse from a carriage on the common road. Each shaft of the vehicle has at the end next thereto a pin, which, when the shafts are connected to the carriage, is secured by a bent lever or tongue moving on an axis between two “side plates” fixed in some convenient manner to the carriage, and which is turned over the pin, and retained in position by a catch, which consists of a small bar mounted on a fulcrum at its lower end, and furnished with a projection which bears upon the end of the bent lever or tongue, being pressed thereon by a spring. While the parts remain in this position the connection between the shafts and the carriage is maintained, but should it be desired to disengage the carriage from the shafts, as, for instance, in the case of the horse running away, the catch of each shaft is drawn into such a position as to release the bent lever or tongue, which then turns backwards and leaves the pin in the shaft at liberty. The catches are acted upon simultaneously by means of a vertical rod mounted in a tube in front of the carriage, which on being pressed downwards presses downwards also a bent bar which acts upon both catches, the bent bar passing through a forked part of the vertical rod, provided with antifricition rollers, so that the bar may move freely when the carriage is “on the lock,” the vertical rod being also provided with springs and a shoulder, by which it is retained in position when not in use.

In connecting two railway carriages three of the apparatuses are used, two of which have chains applied, while the middle one is connected by an apparatus similar to that applied to a shaft, and the bar which connects the three catches is moved by means of a

rod by a guard or other person riding with one of the carriages, such bar being connected to the catches by a pin joint, and there is to be suitable means for securely supporting the rod when the connection of the two carriages is to be maintained.

[Printed, 1s. Drawings. See Repertory of Arts, vol. 16 (*new series*), p. 348; *Mechanics' Magazine*, vol. 34, p. 414; *Inventors' Advocate*, vol. 4, p. 386; *Engineers and Architects' Journal*, vol. 4, p. 234.]

A.D. 1840, November 27.—N° 8727.

CONDIE, JOHN.—“Improvements in applying springs to locomotive, railway, and other carriages.”

This invention relates to a mode of applying springs, or springs and levers, in such manner as not only to give all the benefit and advantages of the usual system, but also to “effect the uniform continuity of the pressure made to bear on the driving or other wheels of locomotive and other carriages,” and promote the constant adhesion of the driving or centre wheels to the rails or road.

Different modes of carrying out the invention are described. In one arrangement an engine or carriage is mounted on six wheels, those in the middle being larger than the others, and the frame of the engine or carriage being provided with four points of support or suspension, these consisting of fulcra on which are placed levers, and such levers being united by links at one end to large bearing springs placed above the axle of the larger wheels, while at the other ends of the levers are vertical bearing rods, which descend to the bearings of the other wheels, the levers being, moreover, jointed together by horizontal connecting rods. Other modifications of the invention are described, in some cases only two bearing springs being used, while in others four are employed, in one arrangement the levers being dispensed with, and the springs being so arranged as to act directly upon the bearings of the axles. The invention is only applicable to engines and carriages “having six or more wheels.”

[Printed, 6d. Drawing. See Repertory of Arts, vol. 16 (*new series*), p. 325; *Mechanics' Magazine*, vol. 34, p. 431; and *Inventors' Advocate*, vol. 4, p. 358.]

A.D. 1840, December 16.—N° 8741.

BEATTIE, JOSEPH.—“Certain improvements in locomotive engines, and in carriages, chairs, and wheels for use upon



" railways, and certain machinery for use in the construction of parts of such inventions."

One part of this invention relates to "a new description of buffing apparatus, by which the carriage is relieved from the great weight of the present ordinary buffing springs, as well as rendered more efficient, and greater security is afforded from breakage of the carriage by violent concussion." Instead of springs only, springs placed alternately with blocks of wood are used, such springs being of the "elliptic or segment form," and the blocks of wood having the fibre "at right angles to the axis of the buffer rod."

Another part of the invention consists "in a break to retard or stop a train of carriages by acting on the wheels of one or two carriages simultaneously and at the same time on each wheel separately;" the action of the break being also caused "to give a whistle or signal to the engine driver" when necessary. The breaks are each formed of "platted rope," connected to a spring plate carried by arms projecting from a lever mounted upon a shaft, upon which is also a toothed segment, in gear with a worm upon a horizontal shaft, to which rotary motion may be given by the guard through the medium of gearing and an upright shaft furnished with a handle. In the arrangement described there is a break on each side of each wheel of the carriage, all being brought into action simultaneously, the spring plates allowing the breaks to adapt themselves to the wheels in any position of the carriage springs, the whole apparatus being connected to the body of the carriage. A whistle is brought into action simultaneously with the breaks, when necessary, by means of a wheel on the upright shaft, which may be thrown into gear with another wheel connected with apparatus by which a piston is made to condense air into a receiver, such condensed air serving to sound the whistle, the latter being provided with the means of altering the sound produced, according to the signal desired.

Another part of the invention consists of a coupling chain, which is composed of two shackles mounted loosely upon rods jointed together, and provided with springs, or with springs arranged alternately with pieces of wood, the coupling being thus elastic "in the direction of its length," and the ordinary traction springs being thus dispensed with.

A mode of constructing a railway wheel is described in which pieces of oak or other suitable wood of segmental form, but fur-

nished with shoulders, are placed with the smaller ends towards the centre of the wheel, the nave or centre of which is of cast iron furnished with mortices to receive them, the fibre of these pieces being in line with the radii of the wheel, and such pieces being secured together by dovetailed and other pieces having the fibre across the plane of the wheel, which being thus far formed is turned up and an inner tyre shrunk thereon, this tyre having a small flange on each side of the interior to secure the wood, and a flange of the ordinary character on the outside, this tyre being turned so as to be somewhat smaller next the flange than at the other edge, and thus affording security to an outer tyre of shear steel which is shrunk upon it, the necessity for rivets being thus dispensed with, and this tyre being capable of removal when worn out in order to be replaced by another. Springs are introduced into some of the pieces of wood forming the wheel, the latter being thus "uniformly elastic." Springs or some other elastic media are also introduced into the nave of the wheel in such manner as to allow the latter to move laterally on the axle in case of its receiving a concussion "from coming in contact with the rail." An axle box is also described as being provided with an "axle guard," between which and the box there is an arrangement of springs and pieces of wood, such as that mentioned above as applied to buffers and coupling chains, this serving to mitigate the effect of a concussion arising from the wheel coming into contact with the end of a rail which is higher than the rest.

Machinery for compressing the segmental pieces of wood and forcing them into the nave of the wheel is also described, and also a lathe "by which two wheels may be bored and turned at the same time, driven from or by the same mean cone pulley;" but these parts of the invention will be noticed in another series of Abridgments. A mode of varying the weight thrown upon the driving wheels of a locomotive engine is also described, but this belongs to the series of Abridgments relating to such engines.

[Printed, 1s. 8d. Drawings. See *Mechanics' Magazine*, vol. 35, p. 56, vol. 65, p. 465, and vol. 67, p. 6; and *Inventors' Advocate*, vol. 5, p. 22.]

A.D. 1840, December 18.—N° 8744.

LINDO, ABRAHAM ALEXANDER.—"Improvements to be applied to railways and carriages thereon, to prevent accidents, and to

“lessen the injurious effects of accidents to passengers, goods, and railway trains.”

This invention consists, in the first place, in a mode of shutting off the steam from a locomotive engine while in motion by means of apparatus connected to the engine, which can be acted upon by other apparatus placed between the rails. The handle of the “steam regulator” has connected to it a short chain, at the end of which is a spring formed somewhat like a “spear head,” there being connected to the point of this spring a longer chain, which hangs downwards and has attached to it a weight. This weight, when the apparatus is not required to act, rests upon two small plates which are hinged to two iron rods, the latter being suspended below the platform of the engine, and forming a kind of swinging frame. The spring mentioned above rests in a ring, to which is attached another short chain, the latter being connected to apparatus for sounding a whistle. In order to cause this mechanism to operate a certain staff or cross bar is mounted upon a second bar capable of being placed in either a horizontal or vertical position, the latter being carried by a suitable support placed between the rails, and when the said second bar is raised to the vertical position the cross bar will catch the swinging frame and cause the small plates which support the weight to pass from underneath it, the weight then falling and pulling down the chain connected thereto, first sounding the whistle by means of the short chain and ring, and then pulling the spear-shaped spring through the ring and closing the steam regulator. The details of these arrangements are minutely set forth, and under different modifications.

Another part of the invention relates to the employment of a “pioneer” for clearing the rails of obstructions. This pioneer consists of an iron frame, which is placed in front of the engine of a train, and has bars connected thereto which extend down to the level of the rails, but on one side of the latter, small shares being employed to remove any obstructions which might be below the flanches of the wheels. Brooms are also attached to the pioneer for the purpose of removing snow and other minor matters from the rails, and if desirable the pioneer may be mounted so as to be capable of sliding upon rods and acting through the medium of springs upon breaks placed in front of the engine wheels. Thus, in case of a serious obstruction being met with, the pioneer would be forced back upon the rods and apply the breaks to the

wheels, while another rod connected to and sliding with the pioneer, might be made to bring into action the apparatus described above for shutting off the steam and sounding a whistle. The pioneer may also be furnished with a padded frame, projecting horizontally in front of it, and capable of picking up men or cattle from the railway, thus acting as a "life preserver."

The invention also includes the use of a central rail, placed between the ordinary rails of a railway, wheels running upon this rail which are mounted in bearings connected to the frames of the engines and carriages, and such bearings also carrying other wheels which run below the upper portions of the rail (which is of T form), and likewise certain balls which are capable of acting against the sides of the vertical part of the rail, these arrangements being meant to prevent engines and carriages from leaving the ordinary lines of rails, and the wheels running upon such central rail serving to support an engine or carriage in case of the failure of any of the ordinary wheels or their axles.

Another part of the invention relates to a "buffer carriage," of which one might be placed in front of the engine and another in the rear of a railway train, for the purpose of lessening the effects of collisions. This carriage consists essentially of two parts or bodies, one of which is less than and capable of being driven into the other, the interior of the apparatus being provided with springs, and the outer ends with circular buffers, filled with some elastic material, such as cuttings of cork, there being outside these, again, mattresses or paddings, filled with some soft material, such as coarse wool. "Similar carriages might likewise be placed at "stations."

Another part of the invention relates to signals, but this will be noticed in the series of Abridgments relating thereto.

[Printed, 4s. 4d. Drawings. See *Mechanics' Magazine*, vol. 35, p. 10; and *Inventors' Advocate*, vol. 4, p. 406.]

A.D. 1840, December 23.—N° 8750.

THORNTON, GEORGE.—"Certain improvements applicable to "railways, locomotive engines, and carriages."

One part of this invention consists in making the flanges of the wheels of locomotive engines and carriages "deeper than they "now exist," and not to extend less than two inches and a half

from the wheel, so as to lessen the liability of engines and carriages to get off the rails.

Another part of the invention relating to locomotive engines consists in the employment of brakes, so arranged as to be raised by "the pull of the engine through the medium of an apparatus" for that purpose between the engine and tender, which, when "the engine ceases to draw (either from necessary or emergent causes) descend upon the wheels with great force and stop the engine," such brakes being "also further available under the discretionary use of the engine driver." This part of the invention may be carried into effect by having large brakes passed over the upper parts of the driving wheels of the engine, such brakes being connected to an arrangement of levers and springs which also form the connection between the engine and tender, and which only allow the brakes to come into action when the engine, as above-mentioned, "ceases to draw;" a lever being provided by which the engine driver may bring the brakes into action.

An arrangement is also described in which the buffer bars of carriages have upon them "wedge inclines," capable of acting upon a pulley or roller mounted on a weighted lever to which brakes are connected, the result of this arrangement being that when the carriages are being drawn onwards, which is effected by chains connected to the buffers, the breaks are raised from and kept clear of the wheels, but on the slackening of the speed of the engine are allowed to press thereon; springs coiled round the buffer rods, and the weighted levers, both aiding in the operation.

Another part of the invention consists in the application of brakes to railway carriages, which are so arranged as to be raised by a traction rope which forms the connection between the engine and tender and the carriages of a train. These brakes are kept out of action while the rope is stretched, but are brought down upon the wheels by the slackening of the rope upon the engine and tender being retarded or stopped, or by accident running off the rails. The traction rope is coiled upon a drum mounted upon one of the axles of the tender, and connected with apparatus by which a suitable distance between the engine and tender and the rest of the train may at all times be maintained.

[Printed, 1s. 2d. Drawings. See Repertory of Arts, vol. 17 (*new series*), p. 345; Mechanics' Magazine, vol. 34, p. 14; Inventors' Advocate, vol. 3, p. 6.]

A.D. 1840, December 28.—N° 8755.

**BUCHANAN, JOHN.**—"Certain improvements in wheel carriages, whether for common roads or railways."

One portion of this invention relates to springs suitable for wheeled carriages, "whether for common roads or railroads," these springs "consisting of two or more plates of steel or any eligible flexible material, kept from contact with each other by a block or blocks of wood in the middle of their lengths, and connected at the ends to each other by loose links or shackles or rollers." This improved spring may either be applied as a bearing or as a buffing spring.

Another part of the invention consists in constructing springs "of two or more plates of steel of different curves, united by rolling or forming the ends of all the plates round one centre or eye, having the plates free from contact with each other, and so far apart, except at the said ends or eyes, as to allow for the difference of radius of curve between the inner and outer plates. The ends or eyes of the plates may be fastened together, if deemed advisable, by solder or rivets, or they may be welded."

Another part of the invention consists in a mode of connecting railway carriages, in which a rope is connected at one end to the axle guard or some other fixed part of the carriage frame, and from thence carried round a pulley on a block, and thence to the buffer rod, to which it is connected by a hook. The block of one carriage is brought into connection with that of the next by means of a right and left-handed screw, which screw is to be turned until the rope of each carriage is drawn tight, and the buffers of each carriage are in contact, the action of the buffer rods at all times "taking up the slack of the rope," and maintaining an "uniform degree of tension throughout the train." Instead of a rope any flexible material or substance may be used.

The other parts of this invention are applicable only to carriages for common roads, and therefore do not require notice here.

[Printed, 14. Drawing. See *Mechanics' Magazine*, vol. 34, p. 462; *Practical Mechanics' Journal*, vol. 3, p. 69; *Inventors' Advocate*, vol. 4, p. 574 (with Disclaimer).]



A.D. 1840, December 28,—N<sup>o</sup> 8756.

ADAMS, WILLIAM BRIDGES.—“Certain improvements in the construction of wheel carriages, and of certain appendages thereto.”

One part of this invention consists in the application to railway carriages of separate bars with buffer heads attached to “shifting fulcrum springs,” in such manner that the same springs will serve both for buffer and traction springs, “double elliptic springs” being in some cases substituted for the shifting fulcrum springs, these latter being included in the patent granted to the present patentee and John Buchanan on the 16th of August, 1839, but not being described in the Specification of that patent as applied to both buffing and traction purposes.

Another part of the invention consists in the application to railway carriages of a mode of guiding such carriages, by means of traction rods placed underneath frames furnished with wheels and axles, which are centrally pivoted to an upper frame or body, the traction rods being connected with the under frames by hasps or staples, and such hasps being removeable, if required, so that such carriages may be adapted to follow curved courses on common roads.

Another improvement in railway carriages consists in “enabling the axletrees to diverge from their parallelism to follow curved courses, by permitting the springs, with their respective wheels and axles, to slide laterally,” and guiding them by traction rods and certain forked bars; and another improvement consists in constructing the bodies of railway passenger carriages in separate frames, which are then bolted together.

The invention also includes a mode of constructing spring wheels of the character of those for which a patent was granted to the present patentee on the 13th of March, 1835, the present improvement consisting “in altering the form of the spring spokes from that of a perfect hoop of steel, or other elastic material, to that of a portion of a hoop with tangential lines, for the better securing them in the nave, and also making all the spokes bear against each other laterally, with or without the intervention of wood or other substance, so as to afford mutual support to each other, and render the wheel stronger, the periphery consisting either of a solid iron tire, or of two or more parts, or of a combination of wood and iron.”



Another improvement consists in the application to the axles and moving joints of wheel carriages of elastic collars or washers formed of leather, or woollen or similar material, "armed with" a surface of polished metal, so that the friction is confined to the metallic surface, thus preserving the elastic packing and preventing the loss of oil."

Another improvement relates to an arrangement of "spring breaks," in which breaks are connected to bars and operated upon through the medium of springs passing round or connected to such bars, and certain levers also connected to such springs. "Self-acting" breaks are also described as being composed of breaks connected by wooden bars to the buffer bars, and sustained by "radius bars" jointed to the axle boxes, or by rods or cords connected to the carriage frame.

Another improvement consists in the employment of "drag staves," which are formed in two parts, one capable of aliding within the other, and a spring or springs being connected with them, and the lower end of the drag staff being furnished with a spike. The patentee mentions that such a drag staff would be a security to railway carriages when ascending inclines, "enabling the engine to rest and accumulate power," and aiding it in again starting the train, the spiked ends of the drag staves preventing the train from running backwards, and the springs becoming compressed by the pressure of the carriages against them.

Another part of the invention relates to the axles of carriages which are moved by "self-contained power," radius bars or frames regulating the axles so as to keep the wheels parallel with the line of progress, and such bars or frames "sustaining the alternate thrust and pull of the moving power through the agency of bands or toothed wheels to multiply the speed without interfering with the free action of the bearing springs," which the ordinary axle guides are found to do, and such radius bars being applicable to railway carriages generally as a substitute for such guides.

The invention further includes the application of shifting fulcrum springs, combined with radius bars, as bearing springs for carriages, and also as buffer springs; also certain modes of suspending carriage frames on bow springs, in one of which the loops or brackets are "within the length of the springs," space being thus economized, while in another mode the curve of the spring is reversed, the effect of which is that on the coupling or

"robbin" breaking the point of the spring would rest within the hollow of the bracket or loop, and sustain the weight of the carriage. Shackle braces are also described as being formed of "fibrous yarn or metallic wire in a continuous skein," "bonded together by adhesive waterproof materials."

[Printed, 1s. Drawing. See *Mechanics' Magazine*, vol. 85, p. 56; and *Inventors' Advocate*, vol. 5, p. 19.]

A.D. 1841, January 6.—N° 8777.

BESSEMER, HENRY.—"A new mode of checking the speed of or stopping railway carriages under certain circumstances."

The patentee says,—"I apply the breaks to friction drums fixed on the centre of the axles of the running wheels, by which I am enabled to adjust them more accurately and prevent them slipping, as at present, as also to simplify the apparatus connected with their action. I propose that to one carriage only in a train the apparatus should be applied, by which the guard communicates the power of the break," "and that the breaks of the different carriages should be connected together by a peculiar coupling," "so that if the guard should set the apparatus in motion over which he has command the whole of the breaks throughout the train should be acted upon at the same time. And I propose also that the guard should always have the full power of the apparatus at his command, to throw it into instantaneous action, instead of having, as at present, to occupy considerable time in bringing the full power of the break upon the wheels, by which a collision would often be prevented, as the speed of the train would at once be checked by all the breaks acting with their full power upon the wheels."

The breaks of each carriage are connected to rods jointed together and to a vertical bar capable of sliding up and down, and having upon it a collar above which is a spiral spring. This spring is compressed when the breaks are drawn from contact with the wheels by means of a chain connected to the junction of the break rods, and certain apparatus by which the vertical bar is raised, this apparatus being put in motion by a horizontal shaft to which rotation is given by gearing, and a handle, turned by the guard when not otherwise occupied, and the breaks being instantly applied when afterwards requisite by the disengagement of a clutch box on the shaft. In order to cause the breaks of

each carriage in the train to be acted upon at the same time the shaft of each carriage is coupled to the shafts of those before and behind it by means of mechanism so arranged as to constitute an universal joint, the parts being at the same time capable of adapting themselves to variations in the distance between one carriage and another.

An arrangement is also described in which each carriage is furnished with breaks which, when requisite, are brought into action by a spring which has been previously compressed through the medium of a rack and a pinion turned by a handle, a clutch being connected with this pinion, which on being thrown out of gear, liberates the spring.

[Printed, 1s. 10d. Drawings. See *Mechanics' Magazine*, vol. 35, p. 62; *Inventors' Advocate*, vol. 8, p. 85.]

A.D. 1841, January 14.—N° 8785.

HANCOCK, WALTER.—“Certain improved means of preventing accidents on railways.”

The first part of this invention relates to a mode of working the breaks of railway engines and carriages by the pressure of water from the boiler of the engine, which is allowed to pass through different ports or passages, which may be opened or closed at pleasure into a cylinder of different diameters, and furnished with pistons of corresponding diameters, these being all mounted upon one piston rod, and the latter being so arranged in connection with certain other rods and levers as to press break blocks against the wheels of the carriages on the admission of water to any or all of the compartments of the cylinder. The breaks of one carriage are connected with those of another by means of longitudinal rods which abut against but are not directly connected with each other, and various arrangements of springs, rods, levers, and other appendages are described as being applicable to the purposes of the invention, some of these arrangements admitting of a train being backed without the breaks coming into action upon the wheels, and others being for the purpose of allowing the breaks to be applied when desirable by hand.

The other parts of the invention, which relate solely to switches and signals, do not require notice here.

[Printed, 1s. 10d. Drawings.]

A.D. 1841, January 28.—N° 8819.

GALL, WILLIAM.—(*A communication*).—"Certain improvements  
" in the construction of locomotive engines and of the carriages  
" used on railways, applicable in part to carriages used on  
" common roads."

[No Specification enrolled.]

A.D. 1841, February 1.—N° 8825.

TAYLOR, WILLIAM WILKINSON.—"Improvements in buffing  
" apparatus for railway purposes."

This invention relates to the application of felt in a series of layers in constructing buffing apparatus for railway purposes. The patentee says,—"I take any of the felting fibres, but in preference I employ ox and cow hair, and I make sheets of felt, as is well understood, of the size and shape desired; and supposing I am going to pad the buffing apparatus now in use by the application of felt, according to my invention, I form holes in the buffer head or surface, and punch holes in felt to correspond in position with the holes in the buffer head or surface, which has heretofore been stuffed in a different manner, and as is well understood, and by means of such hole I attach any desired number of sheets of felt to the buffer head by passing strong string or cord, either linen, woolen, or catgut, through the various layers of felt and through the buffer head, and fasten the ends of the strings employed. I then cover the padding thus obtained to the buffer head with leather or other suitable material, which should be as waterproof as possible, and in stuffing a buffer head such as is now used a series of layers of felt equal to twelve to fourteen inches will be sufficient."

The patentee further states that the elasticity of buffers thus formed is such that he prefers to dispense with the springs and other apparatus generally used, and to depend simply upon buffers formed of layers of felt attached to a board or surface passing from side to side of the carriage or engine and fixed to the framing thereof, the felt in the centre of the carriage buffer being partly cut away, and a hole formed through the seat, and through the board, for the passage of the coupling irons, and the felt being covered with leather or other waterproof material.

[Printed, *6d.* Drawing. See *Repertory of Arts*, vol. 17 (*new series*), p. 208; *Mechanics' Magazine*, vol. 35, p. 174; *Inventors' Advocate*, vol. 5, p. 85.]

A.D. 1841, February 3.—N° 8831.

**BUNNETT, JOSEPH.**—"Certain improvements in locomotive engines and carriages."

This invention consists, "Firstly, of an apparatus for regulating the admission of steam to the working cylinders of locomotive engines, which requires, in order to onward motion, that the engine driver should have his hand constantly applied to it, and which, the moment his hand is removed from it, closes off itself the openings which regulate the admission of steam into the cylinders, and thereby soon brings the engine and carriages which may be attached to it to a standstill," this enforcing the constant attention of the driver to the engine.

Another part of the invention relates to the construction of breaks for engines and carriages.

In one arrangement curved steel plates are mounted on suitable fulcrums so as to extend over the driving and "trailing" wheels of an engine, those on each side of the engine being jointed together, each plate being lined with wood, leather, or some other suitable substance, and the whole being brought into action simultaneously on the wheels by turning a handle fixed on the top of an upright spindle, at the lower part of which is a worm in gear with a wheel upon an axis carrying pinions, which, again, are in gear with toothed segments on the ends of levers connected to the joints of the breaks. Such breaks may be applied to "all or any" of the wheels of an engine, moreover be brought into action by a chain connected to a pulley, which may be turned by gearing and a shaft furnished with a handle.

Another kind of break is described as consisting of a strap or belt, which may be brought into action upon a wheel by means of a bell-crank lever and connecting rod jointed to a collar inside a buffer, the strap or belt being connected at one end to the bell-crank lever, and at the other to a spring, the strap or belt being made to press against the wheel when the buffer is acted upon.

Another part of the invention consists in giving axle boxes a certain degree of play between the axle guards, and placing springs on each side of the boxes, the springs tending to keep the latter in a central position, but yielding in either direction when curves or irregularities occur in the rails, the pressure of the springs being adjusted by set screws.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 35, p. 110, and vol. 37, p. 273; *Inventors' Advocate*, vol. 5, p. 96; *Engineers and Architects' Journal*, vol. 5, p. 71.]

A.D. 1841, March 22.—N° 8900.

WRIGHT, THOMAS.—“ Certain improvements applicable to rail-  
“ way and other carriages.”

The first part of this invention consists in a particular application and arrangement of breaks and sledges for the purpose of stopping or retarding railway or other carriages. Two sledges are suspended near the opposite lower sides of each wheel, by means of rods or frames which are pivoted upon a pin above the centre of the wheel, a bar passing across from one sledge to another, and the result being that when one sledge is pressed against the wheel the other is moved away from it. The sledges are moved to and fro by means of a sliding frame and certain connecting rods, which frame and rods may either be moved by suitable mechanism connected with the carriage, or by the action of the buffers.

Another part of the invention relates to axletrees and axle boxes, this consisting mainly in the formation of a spiral groove in the axle for the purpose of lubrication, along with the use of one or more slide plugs for retaining the wheel in its proper place on the axle, and of a “spring washer” of metal, the object of which is to retain the oil and diminish the friction.

Another improvement consists in constructing springs formed by an arrangement of plates of steel, so contrived that “each plate  
“ will have a different curvature, and that every increase of pressure producing flexion on a portion thereof will bring fresh parts  
“ into action to strengthen the same.”

Another improvement consists in applying to a railway wheel a “double or safety flange,” this consisting, in fact, of an additional and deeper flange, placed outside the ordinary flange, the additional flange presenting “greater obstruction to the wheel running off the rail.”

Another improvement consists in constructing shafts and spokes of sheet steel worked into a tubular form, and filled with cotton, tow, or sawdust, for the purpose of preventing the noise which would otherwise attend their use.

Another improvement relating to railway carriages consists in the application of an elastic plate or bar, which is so contrived as to act not only as a break or sledge, but as a buffer, one end of such plate or bar being connected to a sliding frame, and such plate or bar passing over the hind wheel of one carriage and below the front wheel of the following carriage, the arrangement

being such that on the two carriages approaching nearer together than usual, the plate or bar acts as a spring in opposition to such approach, while, on the other hand, a movement of the sliding frame, which may be produced by any suitable means, causes such plate or bar to act as a break.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 35, p. 302; *Inventors' Advocate*, vol. 5, p. 212.]

A.D. 1841, April 17.—N<sup>o</sup> 8927.

**KENDALL, PETER.**—"An improved method or methods of connecting and disconnecting locomotive engines and railway carriages."

According to this invention a rod or pole passes under the carriage through the centre of three cross pieces secured to the framing, the inner end of the rod being connected to the central part of a bow spring attached by its ends to that cross piece which is immediately behind the axle of the front wheels, the outer end of the rod being provided with two flat "spring grippers" or arms. Between the ends of these spring grippers is a "coupling boss" connected to the coupling chain of the next carriage, or, it may be, of the engine or tender; projections from the end of this boss entering into holes formed in the grippers to receive them.

Each carriage in a train is to be provided with a set of grippers and coupling bosses. "The effect of this method of connection is as follows:—As long as all the carriages in a train remain in the same line of traction, or no further deviation from a straight line takes place than occurs in the worst cases of curvature or deviation known upon railways (excepting always termini and stations), the coupling bosses will remain firmly secured within their respective spring grippers; but when it is desired to disconnect a locomotive engine from a train, as, for example, on its arrival at a terminus, there should be a short line of rails laid down at an angle, more or less acute, with the main line, so that on the engine passing off to that line it shall, by such act of divergence, pull the coupling bosses out of their state of parallelism with the cheeks of their respective spring grippers, whereby they will be instantly set free, and the engine be detached from all the carriages behind," a result which will be produced if at time the engine should improperly leave the line of rails on which a train is travelling. Carriages may likewise be disconnected at pleasure by slightly pulling the bosses out of



line with the bosses, a wedge-formed instrument being also used to separate the grippers when necessary.

[Printed, *6d.* Drawing. See London Journal (*Newton's*), vol. 23 (*conjoined series*), p. 264; Mechanics' Magazine, vol. 25, p. 306; Inventors' Advocate, vol. 6, p. 261.]

A.D. 1841, May 11.—N<sup>o</sup> 8957.

TAYLER, EDMUND.—“Certain improvements in the construction of carriages used on railroads.”

This invention consists, in the first place, in the application of papier maché in the construction of railway carriages, the panels being of about one half the thickness of those usually made of wood, and the roofs being covered with sheets of about one-eighth of an inch thick, the joints of such sheets being covered with strips of wood “to keep out the wet.” Also in a mode of constructing “compound axles” for railway carriages, such axles being composed of an outer tube and an inner shaft, one wheel being fixed on the tube and the other on the shaft, and the whole being secured by suitable shoulders, collars, and pins. Also in a mode of constructing wheels for railway carriages “with a subdivided inner ring for the support of wooden or papier maché felloes.” Also in forming the naves and axles of railway wheels “of wrought iron in one piece.” Also in forming the naves of railway carriage wheels of wrought iron. Also in the application of banded hoops or rings of wood in the construction of railway wheels. Also in the employment of papier maché in the construction of such wheels; in the application of compressed wood for forming the felloes and spokes of such wheels; in the application of wedges of wood or papier maché in the construction of such wheels; and in forming spokes for such wheels of bars of wrought iron, having certain bends and curves in each bar; together with certain methods of carrying several of these particulars into effect.

By a disclaimer and memorandum of alteration which was enrolled on the 3rd of April, 1847, John Coope Haddan, to whom the patent had then been assigned, renounced all claim to a number of the particulars mentioned above, and likewise altered the Specification with regard to others. The particulars of this disclaimer and memorandum of alteration are, however, too long for insertion here.

[Printed, *1s.* Drawing. See Repertory of Arts, vol. 9 (*enlarged series*), p. 148; London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 424; Mechanics' Magazine, vol. 35, p. 413; Inventors' Advocate, vol. 5, p. 325 (with Disclaimer).]

A.D. 1841, May 20.—N° 8961.

CARR, JOHN, junior.—“Improvements in apparatus for retarding and stopping railway carriages.”

This invention consists in an improved mode of arranging apparatus for applying friction breaks to the wheels of railway carriages. Friction blocks are suspended by arms to the side framing of the carriage, and are capable of moving on their points or axes of suspension, and thus allow of being pressed into contact with the wheels, or kept off therefrom by the simple act of moving a rod or bar in the following manner:—An arm or lever is carried by a bracket affixed to the under part of the framing of the carriage. At the end of the arm is a screw nut, which moves on axes or necks in a forked portion of that end of the arm. Through the screw nut passes a screw, which can be turned by means of a handle, and the arm or lever thus be caused to move, moving at the same time another arm connected therewith, and the latter giving motion to the rod or bar which actuates the breaks, which it does through the medium of certain short arms and curved levers, so arranged as to move each pair of blocks in opposite directions.

[Printed, 10d. Drawing. See Repertory of Arts, vol. 17 (*new series*), p. 16; Mechanics' Magazine, vol. 35, p. 446; Inventors' Advocate, vol. 5, p. 345.]

A.D. 1841, May 22.—N° 8963.

WOODS, JOSEPH.—“Certain improvements in locomotive engines, and also certain improvements in machinery for the production of rotatory motion for obtaining mechanical power, which improvements in machinery are also applicable for raising or impelling fluids.”

This invention consists, firstly, in applying “loose wheels” to locomotive engines, “in order to enable them to traverse or travel around curves or curved lines of rails more easily or readily than if all four wheels were fixed on the axles.” These wheels may be secured upon their axles “in any convenient manner, as, for instance, by means of a fixed collar or shoulder formed on the axle on one side of the nave or boss, and a moveable collar on the other capable of being fastened and secured tight by screws, keys, or other means.”

Another part of the invention consists “in an improved means or manner of supplying the end bearings of the axles within

"the brasses or bearings with lubricating material," this being accomplished by the employment of "a small roller placed in a cup or recess underneath the axle," this roller being partially immersed in oil or other lubricating matter, and being turned round by the friction of contact with the axle, thereby carrying up a continuous supply of lubricating material to such axle. The other parts of the invention do not require notice here.

[Printed, 1s. 8d. Drawing. See *Mechanics' Magazine*, vol. 35, p. 489; *Artizan*, vol. 3, p. 42; and *Inventors' Advocate*, vol. 5, p. 357.]

A.D. 1841, June 26.—N° 9009.

LOSH, WILLIAM.—"Improvements in the manufacture of railway wheels." The invention "relates to the application of wood, felt, rope, or such like flexible and yielding material," between the tire and the ring or felloe, "or bearings produced by the prolongation of the bars of iron employed to make the wrought-iron spokes, with or without the intervention of a ring of malleable iron between such bearings and such flexible or yielding materials, by which means wrought-iron railway wheels will be less liable to be prejudicially acted upon by the vibrations to which such wheels are liable when in use than if they were composed of iron alone."

The patentee describes two modes of carrying out the invention, in one of which a ring of wood is introduced between the felloe and the tyre, and a rope in the other. He also states that the constructions of the iron portions of the wheels are similar to some of those for which a patent was granted to him on the 31st of August, 1830, and that he does not claim them separately, nor the application of wood under a tyre generally considered, but that he claims the application of wood, rope, felt, or other flexible and yielding materials between a railway tyre and rings, felloes, or bearings produced by parts which are continuations of the spokes of the wheel.

[Printed, 6d. Drawing. See *London Journal (Newton's)*, vol. 20 (conjoined series), p. 21; *Mechanics' Magazine*, vol. 36, p. 46; *Engineers and Architects' Journal*, vol. 3, p. 65.]

A.D. 1841, July 2.—N° 9015.

PHIPPS, GEORGE HENRY.—"Improvements in the construction of wheels for railway and other carriages."

The object of this invention "is to do away with the necessity

“ for ‘shrinking on’ hot the tires of such wheels, whereby the strength of the iron is often so much diminished by the force of contraction as to cause it to fly or give way when subjected to very slight strains or concussions, and even sometimes whilst under the operation of turning in the lathe.”

The tyre is formed by rolling or forging in the usual manner, and is furnished with an outer flange and an inner rib. The spokes are of wrought iron, and a double set of spokes being placed in position a nave or boss is cast upon their inner ends, and the outer ends, which are enlarged and furnished with bolt or rivet holes, are then rivetted or bolted to the inner rib of the tyre, one set of spokes being on each side thereof. The particular positions of the spokes in relation to each other may be varied.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 36, p. 74; *Engineers and Architects' Journal*, vol. 5, p. 65.]

A.D. 1841, July 7.—N° 9017.

ONIONS, GEORGE.—“ Improved wheels and rails for railway purposes.”

That part of this invention which relates to wheels for railway purposes consists “in casting such wheels of iron made from Cumberland or Lancashire ore,” which wheels “are afterwards made malleable by annealing, and are subsequently case-hardened.”

[Printed, 4d. No Drawings. See *Mechanics' Magazine*, vol. 36, p. 75; *London Journal (Newton's)*, vol. 26 (*conjoined series*), p. 258.]

A.D. 1841, December 21.—N° 9200.

YORK, JOHN OLIVER.—“ Improvements in railway axles and wheels.”

The invention relates, first, to a mode of making hollow axles for railway carriages, by welding two plates together in the form of a tube, the ends of such tube being strengthened by bent plates and hoops. The second part of the invention relates to a mode of applying wood between the iron felloe and the tyre of a railway wheel, and in such manner that the parts of the wood which compose the ring, being made wedge shaped or having inclined surfaces, they may, by sliding against other inclined surfaces, cause the diameter of the wood ring to be increased, and thus tighten the tyre. The mode of carrying out this part of the invention may

be greatly varied. The third part of the invention relates to a mode of bending railway tyre, which is effected by the employment of large rollers, working in combination with small rollers carried by a curved lever or presser bar, certain cutters carried by one of the large rollers also cutting the ends of the tyre so as to bring it to the proper length, the ends being at the same time "thickened" for welding. Or instead of the large rollers two small rollers and a semicircular guage plate may be used, the cutting being effected by other apparatus, the tyre in either case being finally brought into the form of a complete ring, by the use of rollers which are made to travel to and fro by means of suitable gearing, around a circular ring or mould, the tyre being placed between the rollers and such ring or mould. The fourth part of the invention relates to hardening the working surfaces or periphery of railway wheels, in order to render such surfaces more durable. One or more railway wheel tyres are placed in a circular oven of brick, and in contact with the working surfaces thereof ground charcoal is introduced, for the purpose of permanently hardening the iron. It is then submitted to a good red heat, and retained at that temperature for two days or more, and then withdrawn from the furnace or oven, and placed upon a cylindrical form or mould, in order to ensure that the tyre shall be cylindrical, and the tyre and mould are then plunged into cold water and let remain till cold. The cylindrical mould used for this purpose should be made up of parts, so as to separate in order to get off the tyre readily.

[Printed, 1s. 6d. Drawings. See Repertory of Arts, vol. 18 (*new series*), p. 321; *Mechanics' Magazine*, vol. 39, p. 25.]

A.D. 1842, February 15.—N<sup>o</sup> 9261.

CRAMPTON, THOMAS RUSSELL, and HADDAN, JOHN COOPE.—"Improvements in steam engines and railway carriages."

This invention comprises, "the application to locomotive steam engines and railway carriages of cylindrical wheels, with outside flanches fitted to axles, which will allow each wheel to run independent of the other;" also, "affording additional security to locomotive steam engines, by the addition thereto of extra (safety) wheels or sledges;" also, the application to railway carriages of springs, "formed by levers acting upon and twisting

"bars or tubes of steel;" also, the application to railway carriages and locomotive steam engines of wheels "with felloes of wood, papier machee, or other suitable material, tightened by a bevelled ring or circular wedge;" and also, the application to railway carriages and locomotive steam engines of wheels "formed with wooden felloes simultaneously compressed, by being forced through a conical ring, or by means of an improved arrangement of screws or hydraulic presses."

These particulars are described at some length.

The axles carrying the cylindrical wheels may be composed either of a solid shaft passing through a tube, or be otherwise formed so as to allow the wheels to rotate separately. The small safety wheels or sledges may be "either with or without springs," and the sledges (if used) flanged if desirable. The springs formed by levers acting upon and twisting bars or tubes of steel may be variously modified, and applied both as bearing and buffer springs. The "circular wedge" for tightening the felloes of wood, papier maché, or other substance is inserted between the latter and a flanged ring carried by the spokes of the wheel, thus driving the felloe against the inside of the tire; and the arrangement of screws or hydraulic presses last mentioned comprises six such screws or presses, which are made to act simultaneously upon six blocks of iron, moving between guide pieces on a cast-iron table.

[Printed, 1s. 8d. Drawings. See *Mechanics' Magazine*, vol. 37, p. 340; *Record of Patent Inventions*, vol. 1, p. 35.]

A.D. 1842, March 4.—N° 9274.

SLAUGHTER, EDWARD.—"Improvements in the construction of iron wheels for railway and other carriages."

This invention consists in forming a wheel suitable for use either on railways or common roads, "with an outer ring having a dovetailed groove or recess, and spokes having a corresponding projection;" or, "vice versâ, with spokes having a dovetail groove or recess, and an outer tyre having a projecting corresponding dovetail, so that the wheel shall be held together by means of dovetails to the spokes and rings."

The spokes may be of various forms, but an arrangement is described in which they are each bent into a figure somewhat resembling that of a heart, the broader ends being, however, made to correspond with the inner curve of the tyre, and the smaller



and inner ends being united by a nave of metal cast upon them. The dovetail grooves or projections may be formed by any suitable means.

[Printed, *Ad. Drawings*. See *Repertory of Arts*, vol. 1 (*enlarged series*), p. 10; *Mechanics' Magazine*, vol. 37, p. 475; *Record of Patent Inventions*, vol. 1, p. 88.]

A.D. 1842, March 10.—N° 9291.

SMITH, HENRY.—“Improvements in the construction of wheels and breaks for carriages.”

The first part of the invention “relates to a mode of making railway wheels by combining cast-iron centres, wood felloes, and wrought-iron or steel tyre, and in such manner that the parts of wood of which the felloes are formed may be caused to be forced out and separated by means of wedges, in order to expand the circle of wood of which the felloe of a wheel is composed,” the wedges acting upon “angular pieces” introduced between them and the other parts of the wood, and being themselves acted upon by screws. Another part of the invention relates to a mode of applying steel on the working surface of railway tyres, and consists in rolling an iron bar into tyre form, with a groove on the outer side, into which groove a bar of steel is introduced, which is bevilled at its sides, such bar being by preference cold. The iron bar, together with the steel, is then passed between rolls, the grooves in the rolls being of a proper figure to complete the shaping of the bar of tyre, by which means the edges of the groove are closed over the bevilled sides of the steel bar, and this, together with the shrinkage of the hot iron after rolling will securely hold the steel in its place. Another part of the invention relates to the application of breaks to the wheels of railway carriages, “and the improvements consist in working breaks in such manner that the engineer may, when desired, cause the breaks to act on their respective wheels, in consequence of their being connected by suitable apparatus to one of the axles of locomotive engines or of the tender.”

In one mode of carrying out this part of the invention, one of the axles of the engine or tender is provided with friction apparatus, which may be caused to put in motion a horizontal shaft, furnished with a worm, which then acts through the medium of a toothed sector upon a rod, by which the break apparatus is



brought into action, this apparatus being of the ordinary character, and the arrangement being such that the friction apparatus will either press the breaks against the wheels or remove them therefrom at pleasure. In another arrangement, a drum fixed on one of the axles of the engine or tender has a chain passed loosely round it, this chain being connected at one end to a lever, which may be moved by hand so as to tighten the chain on the drum, and the friction then produced on the chain causing it to act upon a rod to which it is fastened, and which rod again acts upon the break apparatus. In both arrangements suitable provision is made for the varying distances between the engine, tender, and carriages of a train; in the first case by causing some of the parts used to slide upon others, and in the second case by a certain combination of links and rods.

[Printed, 1s. 4d. Drawing. See Repertory of Arts, vol. 18 (new series), p. 273; Record of Patent Inventions, vol. 1, p. 122.]

A.D. 1842, March 21.—N° 9298.

**JESSOP, SYDNEY.**—"An improved mode of preparing wrought iron intended for wheel tires, rails, and certain other articles."

This invention consists in the preparing of such wrought iron as is intended for wheel rims, wheel tires, rails, tram plates, switches, and such other like articles, having a wearing surface or wearing surfaces exposed to more friction than their other surfaces, by placing them in a carbonizing furnace in such manner as to expose what are intended to be their wearing surfaces only to the process of carbonization, and protecting their other surfaces therefrom by suitable arrangements of position and fuel, and afterwards rolling, hammering, swaging, or otherwise consolidating the metal on such surfaces, so as to make it hard, compact, and even all over.

An arrangement is shown in which flanged bars suitable for the rims of railway wheels are laid in pairs, in such manner that the parts intended for the wearing surfaces only are exposed to the action of charcoal or some other carbonizing fuel; while in another arrangement, rims already brought into a circular form are laid one upon another, the fuel only acting upon the outsides of such rims.

[Printed, 1s. Drawing. See Record of Patent Inventions, vol. 1, p. 120.]

A.D. 1842, April 26.—N° 9332.

PALMER, HENRY ROBINSON.—“An improvement or improvements in the construction of roofs and other parts of buildings, and also for the application of corrugated plates or sheets of metal to certain purposes for which such sheets or plates have not heretofore been used.”

One part of this invention consists in the application of corrugated plates or sheets of metal “to railway and other wheels in place of the spokes or arms.” The rims and naves may be cast upon plates which have been previously prepared, and tires may be added thereto in the usual way.

The other parts of the invention contain nothing which requires notice here.

[Printed, 1s. 10d. Drawings. See London Journal (*Newton's*), vol. 23 (*conjoined series*), p. 77; Record of Patent Inventions, vol. 1, p. 237.]

A.D. 1842, April 28.—N° 9334.

PAPE, JOHN HENRY.—“Improvements in carriages, and in the construction of wheels.”

These improvements are applicable both to railway carriages and to carriages for common roads. According to the first part of the invention wheels are placed upon an axle which revolves within a tube, the latter containing inside each end brasses by which the axle is supported, and such brasses being kept in their places by means of boxes; one part of each box being fixed to the tube by means of screws, and being lined with a piece of leather to keep it grease-tight, while the other part of the box fits loosely upon the nave of the wheel next to it, “thus serving to keep the wheel in its place in case of the fracture of the axis,” certain screws passing through the box and projecting into a groove in the nave, and certain hooks connected to the spokes of the wheel passing behind a projecting portion of the box. The tube is also furnished with internal rings, which aid in sustaining the axle, and a shoulder near each end of the latter is provided with a scoop which at each revolution of the axle takes up a portion of grease (which is run into the tube), and conveys it to the brasses. This contrivance is meant for use chiefly in cases in which the bearings of the axle are inside the wheels, when such bearings are outside such wheels the hooks and the screws which pass into the nave of the wheel may be dispensed with.

Another part of the invention consists in a mode of stopping carriages by means of a screw which is placed in a vertical position above the axle, and so arranged that upon being slightly turned it will force certain brasses against the axle. This screw is, according to one arrangement, furnished with an arm or lever which is attached to one end of a flat spring, this spring, when at liberty, keeping the screw in such a position that the brasses are kept in contact with the axle, but the spring being also connected with the draw-hook of the carriage, so that the brasses are removed from the axle when that hook is acted upon in pulling the carriage forward, but are pressed into contact with the axle "the moment the moving power ceases." Instead of a flat spring, a spiral spring, coiled around the axis of the screw, may be used. In the case of a carriage for common roads, arrangements must be made for releasing the spring and allowing it to act upon the axle by means of a pedal at command of the driver. And a modification of the first part of the invention is described as being applicable to carriages for common roads in which the axle inside the tube is in two parts, instead of being all in one piece.

Another part of the invention consists of a wheel, the spokes of which are composed of tubes, within which are inserted spiral springs, coiled springs, fixed to iron branches, which are connected to the rim of the wheel, and terminating in iron rods, being so arranged that the ends of such rods rest upon the spiral springs, the wheel thus being rendered elastic. Outside the rim of the wheel is a layer of felt, "or other yielding substance," and outside that again a tyre of iron, or other suitable substance. This part of the invention is minutely set forth, and a mode of bending wood when wood is used for the rim or felloe of the wheel, is described as consisting in driving "taper oval piers" of hard wood, dipped in asphaltum, into "circular holes" bored in the wood; steam or dry heat, however, being used if desirable.

Another part of the invention relates to springs for carriages. A semicircular spring is attached at the lower end to the axle box or some other suitable part, and terminates at the other and upper end in a coil to the centre of which is connected a link, which is also connected to the body of the carriage by a certain "centre." Around this centre a strap passes, which strap is also passed around the semicircular spring, and the result of this arrangement is that as the load borne by the carriage increases the strap causes the spring to bear in succession, through the

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The other parts of the invention contain nothing which requires notice here.

[Printed, 1s. 10d. Drawings. See London Journal (*Newton's*), vol. 23 (*conjoined series*), p. 77; Record of Patent Inventions, vol. 1, p. 237.]

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Another part of the invention consists in a mode of stopping carriages by means of a screw which is placed in a vertical position above the axle, and so arranged that upon being slightly turned it will force certain brasses against the axle. This screw is, according to one arrangement, furnished with an arm or lever which is attached to one end of a flat spring, this spring, when at liberty, keeping the screw in such a position that the brasses are kept in contact with the axle, but the spring being also connected with the draw-hook of the carriage, so that the brasses are removed from the axle when that hook is acted upon in pulling the carriage forward, but are pressed into contact with the axle "the moment the moving power ceases." Instead of a flat spring, a spiral spring, coiled around the axis of the screw, may be used. In the case of a carriage for common roads, arrangements must be made for releasing the spring and allowing it to act upon the axle by means of a pedal at command of the driver. And a modification of the first part of the invention is described as being applicable to carriages for common roads in which the axle inside the tube is in two parts, instead of being all in one piece.

Another part of the invention consists of a wheel, the spokes of which are composed of tubes, within which are inserted spiral springs, coiled springs, fixed to iron branches, which are connected to the rim of the wheel, and terminating in iron rods, being so arranged that the ends of such rods rest upon the spiral springs, the wheel thus being rendered elastic. Outside the rim of the wheel is a layer of felt, "or other yielding substance," and outside that again a tyre of iron, or other suitable substance. This part of the invention is minutely set forth, and a mode of bending wood when wood is used for the rim or felloe of the wheel, is described as consisting in driving "taper oval piers" of hard wood, dipped in asphaltum, into "circular holes" bored in the wood; steam or dry heat, however, being used if desirable.

Another part of the invention relates to springs for carriages. A semicircular spring is attached at the lower end to the axle box or some other suitable part, and terminates at the other and upper end in a coil to the centre of which is connected a link, which is also connected to the body of the carriage by a certain "centre." Around this centre a strap passes, which strap is also passed around the semicircular spring, and the result of this arrangement is that as the load borne by the carriage increases the strap causes the spring to bear in succession, through the

medium of rods, upon spiral springs placed in tubes, these being connected to the inner parts of the spring. Different modifications of this part of the invention are described, in some cases the spring consisting of several thicknesses of steel, and the strap being variously arranged according to circumstances, and in other cases these coiled springs and straps being combined with the ordinary flat springs.

Another part of the invention relates to the construction of a carriage, of which the body is placed very low, and rests only on two large wheels, there being behind or underneath the carriage a small wheel "after the fashion of a castor, for the purpose of maintaining the equilibrium." The axle is cranked, and the springs placed under the body of the carriage, crossing each other diagonally, being of considerable length and flexibility. Framework for a carriage is also described as being composed of metal tubes, combined with spiral springs, "which may be used in a variety of ways."

The details of the invention are set forth at some length, and under various modifications. The door of the carriage mentioned above is placed at the back, and the small wheel is mounted in bearings connected to a vertical rod working in a tube in which is a spiral spring, the diagonal springs being if desirable combined with coiled springs.

[Printed, 10d. Drawing. See Record of Patent Inventions, vol. 1, p. 238.]

A.D. 1842, April 28.—N<sup>o</sup> 9335.

LOSH, WILLIAM. — "Improvements in the construction of wheels for carriages and locomotive engines intended to be employed on railways."

This invention consists, firstly, in a method of fixing the tyres, whether of cast or malleable iron, upon the felloes of wheels, by iron keys employed so as to enlarge the circumference of the felloe, and thus produce the necessary pressure against the tyre.

Secondly, in a method of fixing tyres, whether of cast or malleable iron, upon the felloes of wheels by powerfully compressing the felloes, and in this state fixing them within the tyres.

Thirdly, in a mode of fixing cast-iron tyres upon straight curved malleable iron arms by wedging.

And, fourthly, in making the malleable iron arms and felloes

of wheels in several pieces, placed against each other, and secured in the nave as usual, so as to form a compound spoke or arm and fellow, instead of having the same formed of one piece, by which a very firm and tenacious junction is secured with the nave, and greater flexibility is obtained in the arm or fellow, and, consequently, the wheel is less liable to fail when exposed to the action of sudden shocks or twists; the patentee claiming the placing of these separate pieces of each compound spoke, either directly above each other when the wheel is placed horizontally, or with the joints of the different layers intersecting each other.

The first part of the invention appears to be meant to apply solely to wheels in which the fellow is composed of bent portions of wrought-iron bars which form the spokes, in some cases both blocks and wedges being employed, and the result in all cases being that such bent portions are forced outwards; and the second part of the invention relates to wheels having similar spokes, these being compressed by the use of a ring composed of segments drawn together by screws before the tyre is placed upon them, and their elasticity causing them afterwards to press strongly against the interior of the tyre. In the third part of the invention the spokes of the wheel are double, and the outer ends are secured by wedges within dovetailed recesses formed in bosses with which the inside of the tyre is furnished, the wedges being inserted between the ends of the two pieces forming the spoke.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 1 (*enlarged series*), p. 72; Record of Patent Inventions, vol. 1, p. 234.]

A.D. 1842, May 23.—N<sup>o</sup> 9355.

BISHOP, JOHN.—“A new or improved construction of brake apparatus applicable to railway carriages.”

According to one part of this invention one of the axles of a carriage wheel has loose upon it a “cylindrical box,” and upon this is mounted a worm so arranged as to revolve therewith, but to be capable of sliding endwise thereon, the interior of the worm being slotted, and a pin on the box entering the slot. The worm is in gear with a wheel to which one half of a clutch box is connected, the other half of which slides on a short upright shaft; this shaft, by means of the usual adjuncts to the clutch box, being made to rotate on the clutch box being closed and turned round, there being on the upper end of this shaft an arm or lever jointed to a connecting rod, which on the shaft being turned partially round



is made to bring into action brake apparatus, the whole of which is of the ordinary character. On each side of the cylindrical box mentioned above is a box or collar furnished with teeth, and forming in fact one half of a clutch box, sliding to and fro on the axle, but revolving with it, and the cylindrical box is also provided with teeth at each end, and these teeth being acted upon by those of the sliding boxes the cylindrical box and the worm thereon rotate with the axle, and the worm gives motion to the wheel carrying the lower half of the clutch box on the upright shaft. The upper half of this box is operated upon so as to raise it out of gear or place it in gear with the lower half by means of a horizontal rod under the carriage, which is mounted in slings so as to be capable of rising and falling, and the rod of the first carriage in the train is raised by means of a small chain which is connected to a "tug chain," by means of which that carriage is attached to the tender, and also to a small drum borne by the carriage and provided with certain gearing and a winch. The small chain passes in its way from the tug chain to the drum below pulleys connected to the horizontal rod, and thus on the slackening of the small chain, either owing to the slackening of the tug chain through a diminution of the speed of the engine and tender, or by its being unwound from the drum, for which provision is made, the horizontal rod allows the clutch box on the upright shaft to come into gear, and the brake apparatus is brought into action through the medium of the worm and other parts on the axle of the carriage, which now cause the upright shaft to rotate. On the brakes, however, being brought tightly against the wheels the worm has a tendency to slide on the "cylindrical box," and the result is that it is made to move endwise the clutches on each side of such box, and so disengage them from the latter, the rotation of the worm then ceasing, the end movement of the clutches being, however, resisted by certain levers and a spring; this spring serving in fact to limit the force with which the brakes shall be pressed upon the wheels.

These arrangements are described at considerable length, and are susceptible of various modifications. Thus a worm may be placed upon the axle of the carriage, and the "cylindrical box" be dispensed with, and either flat or spiral springs applied to limit the force of the breaks. The tug chain may act upon the horizontal rod without the intervention of a small chain, and the apparatus may be made to operate "rail brakes" as well as brakes

for wheels. The drum and small chain with the gearing and winch mentioned above enable the brakes to be applied to or removed from the wheels or rails at pleasure, and also afford the means of preventing the brakes from coming into action when the train is being backed. The tug chain should be of considerable length, in order to ensure the action of the brakes to a sufficient extent to prevent the first carriage from striking the tender in case of the latter slackening in speed, and a carriage for parcels or luggage may be provided with brake apparatus, and connected to the last carriage of a train by a long chain, such a carriage serving to prevent the engine of a following train from overtaking the passenger carriages of the first train. Brake apparatus of the kind described should also be applied to the tender of a train as well as to the carriages, and the latter may be supplied with "common brake apparatus" in addition to that mentioned above.

[Printed, 1s. 8d. Drawings. See Record of Patent Inventions, vol. 1, p. 293.]

A.D. 1842, June 13.—No 9390.

**BANKS, THOMAS.**—"Certain improvements in the construction of wheels and tyres of wheels to be employed upon railways."

The improvement in the construction of wheels "consists in a peculiar mode of constructing the nave or boss of such wheels, for the purpose of securely fastening the wrought-iron arms or spokes in the nave and preventing their becoming loose." The spokes or arms are welded, rivetted, or otherwise securely attached to a wrought-iron ring, and then the boss or nave is formed by casting or running melted metal entirely around the ring, so as to embrace and enclose the inner ends of the spokes and the ring. "The securing the wrought-iron arms to a ring of wrought iron, previous to casting the metal around the ends of such arms to form the nave or boss of railway wheels, will be found to increase the security of the arms in the nave or boss, and to add greatly to the strength and durability of such wheels." The improvement in the tyres of wheels "consists in placing or inserting a hoop, bar, or segments of steel, iron, or hard metal in a groove, turned or otherwise formed entirely around the outer rim or periphery of a railway wheel, such groove being properly shaped to receive the steel or other hard metal." The

patentee does not claim the use of steel in tyres except when thus applied.

[Printed, &c. Drawing: See London Journal (*Newton's*), vol. 23 (*continued series*), p. 361; *Artizan*, vol. 6, p. 122; Record of Patent Inventions, vol. 1, p. 396; Engineers and Architects' Journal, vol. 11, p. 184.]

A.D. 1842, June 21.—N<sup>o</sup> 9398.

**DICKSON, JOHN.**—"Improvements in rotatory engines and "boilers, in stopping railway carriages, and in machinery for "propelling vessels, part of which improvements are applicable "to propelling air and gasses."

Although one part of this invention is set forth above as being applicable to stopping railway carriages the patentee does not clearly describe any such application. The first part of the invention consists in the employment of certain propelling boards or plates, actuated by means of a chain or chains, and passing through a cylinder or cylinders, these boards or plates being obviously capable of application either as propellers or retarders, such boards or plates being so arranged as to work either in water or other fluid. These arrangements are also applicable to the raising of water, to draining fens or marshes, and to propelling air or gas in any direction. Arrangements are also described which are suitable "for the purpose of exhausting the condensers "of steam engines, or any other vessel where exhaustion is found "necessary," and also other arrangements, which, however, have no bearing upon the subject of the present series of abridgments.

[Printed, 16d. Drawing: See Record of Patent Inventions, vol. 1, p. 412.]

A.D. 1842, July 16.—N<sup>o</sup> 9421.

**BENTON, ROBERT.**—"Certain improvements in propelling, "retarding, and stopping carriages on railroads."

One part of this invention consists in forming railway carriages without bearing wheels, and furnishing them instead with metallic rails or beds, which are grooved and lined with concave bars of wrought iron, these bars sustaining the carriage upon wheels having rounded rims, and a number of such wheels, mounted on axes along each side of the line of way, and caused to revolve by suitable means, serving to propel the carriage onwards. The carriages are furnished with small wheels, which run above tracks or passages formed in walls on each side the way, and thus if any of the carriage rails, or the wheels which support them, should

break, the small wheels will rest upon the walls and sustain the carriage; these wheels serving also to conduct the carriage into sidings. Levers also project downwards below the carriage, which by means of other levers ascending through the bottom of such carriage may be pressed against friction rings borne by the wheels on which the carriage travels, the motion of the latter being thus retarded on the upper ends of the levers in the carriage being drawn towards each other. A mode is also described of retarding and stopping trains on an ordinary railway, in which a low truck carries two bent levers, both mounted on the same fulcrum, the outer ends of these levers projecting beyond one end of the truck, and the inner ends being connected to chains which are coiled in opposite directions round a small drum which may be turned by a winch and wheels so as to cause the inner ends of the levers to approach towards and the outer ends to recede from each other, the latter in this case being made to press sideways against plates of iron fixed in low walls or other supports outside each line of rails. The fulcrum of the levers is supported by a ball and socket arrangement, which allows their outer ends to rise over any small obstacle to the progress of the carriage. This arrangement may be varied by so forming the outer ends of the levers as to press against the outer sides of the ordinary lines of rails when made to approach each other, the other ends in this case being drawn apart when it is desired to retard or stop the train. A drum, chain, and wheels with a winch may also be used for operating upon the retarding levers in the arrangement first described.

Another part of the invention consists in mounting on the front part of a locomotive engine "safety rollers having concave surfaces," which rollens, in the event of the front axle or wheels breaking, will sustain the engine and prevent it from leaving the rails.

The invention comprises other particulars, none of which, however, require notice here.

[Printed, 1s. 2d. Drawings. See Record of Patent Inventions, vol. p. 477.]

A.D. 1842, July 23.—N° 9427.

JOHNSTON, ALEXANDER. — "Certain improvements on carriages, which may also be applied to ships, boats, and other purposes where locomotion is required."

This invention consists "in the application of guide wheels or rollers to railway and other carriages, attached to the sides of each carriage and placed so as to act against the side or edge of the rails, in order to prevent or diminish the friction and consequent loss of the moving power, stripping or injuring the rails, and other disadvantages arising from the flanges rubbing on the rails."

"The rollers may be inserted and held in forks" formed in the ends of stays arranged to receive them, and "be made to turn on a pin or axle." "These rollers, being intended to supersede or form a substitute for flanges, may also be placed somewhat nearer to the rails than the medium distance of the ordinary flanges as at present in use, but so as to allow sufficient play to the carriage," such rollers being placed in an inclined position, "similar to the base of a cone," thus presenting "a vertical surface to the rail."

Different modifications of the invention are described, and the invention may be "applied to carts and other vehicles, to adapt them for being used also on railways wholly or partially laid on common roads," the details of the invention being capable of many variations.

By a disclaimer and memorandum of alteration which was enrolled on the 23rd of January, 1843, the patentee enounced all claim to this invention as "applied to ships, boats, and other purposes where locomotion is required."

[Printed, 4d. No Drawings. See Record of Patent Inventions, vol. 1. p. 490.]

A.D. 1842, August 3.—N<sup>o</sup> 9437.

LEE, JOHN.—"Certain improvements in wheels and axletrees to be used on railways, and in machinery for stopping on or preventing such carriages from running off railways, which improvements may be also applied to other carriages and machinery."

This invention is described at considerable length, and embraces a variety of details, which will only be understood with the aid of the drawings annexed to the Specification. The first part of the invention relates to improved axles, "which are distinguished into three parts; first, the ordinary axle divided into two parts," which are joined together by coupling collars; secondly, "auxiliary axles" composed of bars of metal connected

to curved plates placed on the nave of the wheel, these "auxiliary axles" being for the purpose of serving as supports in case of the other axles breaking; and thirdly, certain bearing collars, which in combination with the curved plates and certain other appendages secure the auxiliary axles to the naves of the wheels.

The next part of the invention relates to improved naves for wheels, "which are distinguished in three particulars from ordinary naves; first, by increased length; second, by being grooved for collars for the axles; and, third, by being grooved for collars for the brakes;" the latter being supported by the naves, and connected to arrangements of levers which may be operated by various different means, and the brakes being so formed that when brought into action they press not only against the carriage wheels, but upon the rails also. These levers are either operated upon by the buffers of a carriage, in case of collision, through the medium of a spring, a "brake bar," and other adjuncts; or by means of a windlass or wheel, having handles on its periphery, and a female screw in its centre, through which a screwed shaft passes, the windlass being turned by the guard, or by means of a pipe passing from the engine, and supplying steam to a plug or piston when requisite.

Another part of the invention consists in supplying each carriage with blocks carrying guide plates, the latter passing, when the carriage is traversing the ordinary rails, along each side of guide rails, placed inside of and made much higher than the ordinary rails, the blocks resting upon the latter, and sustaining the carriage in case of accidents happening to the wheels or axles. The blocks may, if desired, be furnished with small rollers or wheels, which will render them available as temporary substitutes for the ordinary wheels in case of accident to the latter.

The invention includes a mode of limbering up gun carriages; and the patentee states that he claims his improved axles and naves not only as applied to carriages, but to "wheelwork in machinery."

[Printed, 2s. 8d. Drawings. See Transactions of the Society of Arts, vol. 54, p. 191; extended for 5 years.]

A.D. 1842, September 16.—N° 9473.

JAMES, WILLIAM HENRY.—"Certain improvements in railways and carriage ways, railway and other carriages, and in the modes of propelling the said carriages, parts of which improvements are applicable to the reduction of friction in other machines."



One part of this invention relates to the construction of carriages suitable for travelling upon certain elevated lines of railway. The framework of these carriages is so formed as to hang down below the surface of the railway on each side of the latter (the body of the carriage, however, being above the rails), and the carriages being mounted upon either wheels or rollers; in some cases such rollers extending nearly the whole breadth of the carriage, while in others three broad rollers are mounted on one axle. The carriages are also provided with flanged rollers placed upon vertical spindles, these rollers bearing against side rails or projections formed on each side of the railway, and so preventing the carriages from leaving the rails, the projecting framing also tending to prevent such an accident.

Another part of the invention consists in adapting to the axles of carriages certain wheels which the patentee calls "relief wheels," as they tend to lessen the friction of the axles. This part of the invention consists in reality in mounting the body of the carriage upon the axles through the medium of wheels suitably arranged upon short axes carried by the framing, and furnished with internal rings which rest upon small double-flanged wheels fixed on the ends of the axles, the relief wheels thus revolving by contact with the small wheels on the axles. These relief wheels may be applied not only to carriages such as mentioned above, but also to other carriages. This part of the invention may be varied by mounting relief wheels in the framing of the carriage below the ends of the axles, and passing bands or straps round the relief wheels and the small wheels fixed on the axles, which bands or straps may be made elastic, so as to serve as springs to the body of the carriage. Or a further variation may be made by placing loose wheels or pulleys on the axles to receive such straps or bands, and other modifications made according to circumstances.

Another improvement in carriages consists in causing the carriage to travel upon a series of rollers, the axles of which are connected to endless chains passed round wheels mounted near each end of the carriage frame, the endless chains bringing the rollers in succession beneath such carriage frame.

Another part of the invention consists in forming the springs upon which the body of a carriage rests of a series of air beds or cushions, which are placed upon platforms resting upon the axles of the wheels, the lower portions of the carriage body resting upon these cushions, and being provided with guide rods, these



portions of the carriage, being, moreover, "made in the shape of "inverted open boxes," which prevent the access of dust to the cushions, and this being further guarded against by the boxes and platforms being connected by folds of caoutchouc cloth or other suitable material.

Another part of the invention relates to the construction of an omnibus suitable for travelling either upon common roads or "elevated carriage ways," which may or may not be provided with rails; but there is nothing in this part of the invention which properly belongs to this series of Abridgments, nor do the remaining parts of the invention require notice here.

[Printed, 1s. 8d. Drawings.]

A.D. 1842, October 8.—N<sup>o</sup> 9485.

YORK, JOHN OLIVER.—"Improvements in the manufacture of "axles for railway wheels."

The first part of this invention relates to making railway, locomotive, and carriage axles each of plates welded into the form of a tube, in a similar manner to that described in the Specification of the patent granted to the present patentee on the 21st of December 1841, but in this case the necks being "forged thereon "without adding thickening pieces."

Secondly, the invention consists in a mode of making hollow axles for locomotives and railway carriages when using three or more pieces, "with the hollow part thereof at least half or more "than half the whole diameter of the axle," the patentee mentioning several advantages as arising from this arrangement.

Thirdly, in strengthening the ends of hollow railway axles by "tubular pieces," this arrangement allowing the rest of the axle to be of thinner metal than usual.

Fourthly, in attaching a ring formed in two pieces, or other suitable piece of mechanism, to the nave of a railway wheel, in such manner as to form a support for the axle should the latter break near such nave.

Fifthly, in a mode of constructing solid as well as hollow axles, and affixing them to wheels. The ends of the axles are constructed so as to enter bell-mouthed tubes, into which they are keyed, the tubes themselves entering and being keyed within the naves of the wheels.

Sixthly, in "combining dies for forging or pressing necks at

One part of this invention relates to the construction of carriages suitable for travelling upon certain elevated lines of railway. The framework of these carriages is so formed as to hang down below the surface of the railway on each side of the latter (the body of the carriage, however, being above the rails), and the carriages being mounted upon either wheels or rollers; in some cases such rollers extending nearly the whole breadth of the carriage, while in others three broad rollers are mounted on one axle. The carriages are also provided with flanged rollers placed upon vertical spindles, these rollers bearing against side rails or projections formed on each side of the railway, and so preventing the carriages from leaving the rails, the projecting framing also tending to prevent such an accident.

Another part of the invention consists in adapting to the axles of carriages certain wheels which the patentee calls "relief wheels," as they tend to lessen the friction of the axles. This part of the invention consists in reality in mounting the body of the carriage upon the axles through the medium of wheels suitably arranged upon short axes carried by the framing, and furnished with internal rings which rest upon small double-flanged wheels fixed on the ends of the axles, the relief wheels thus revolving by contact with the small wheels on the axles. These relief wheels may be applied not only to carriages such as mentioned above, but also to other carriages. This part of the invention may be varied by mounting relief wheels in the framing of the carriage below the ends of the axles, and passing bands or straps round the relief wheels and the small wheels fixed on the axles, which bands or straps may be made elastic, so as to serve as springs to the body of the carriage. Or a further variation may be made by placing loose wheels or pulleys on the axles to receive such straps or bands, and other modifications made according to circumstances.

Another improvement in carriages consists in causing the carriage to travel upon a series of rollers, the axles of which are connected to endless chains passed round wheels mounted near each end of the carriage frame, the endless chains bringing the rollers in succession beneath such carriage frame.

Another part of the invention consists in forming the springs upon which the body of a carriage rests of a series of air beds or cushions, which are placed upon platforms resting upon the axles of the wheels, the lower portions of the carriage body resting upon these cushions, and being provided with guide rods, these

portions of the carriage, being, moreover, "made in the shape of "inverted open boxes," which prevent the access of dust to the cushions, and this being further guarded against by the boxes and platforms being connected by folds of caoutchouc cloth or other suitable material.

Another part of the invention relates to the construction of an omnibus suitable for travelling either upon common roads or "elevated carriage ways," which may or may not be provided with rails; but there is nothing in this part of the invention which properly belongs to this series of Abridgments, nor do the remaining parts of the invention require notice here.

[Printed, 1s. 6d. Drawings.]

A.D. 1842, October 8.—N<sup>o</sup> 9485.

YORK, JOHN OLIVER.—"Improvements in the manufacture of "axles for railway wheels."

The first part of this invention relates to making railway, locomotive, and carriage axles each of plates welded into the form of a tube, in a similar manner to that described in the Specification of the patent granted to the present patentee on the 21st of December 1841, but in this case the necks being "forged thereon "without adding thickening pieces."

Secondly, the invention consists in a mode of making hollow axles for locomotives and railway carriages when using three or more pieces, "with the hollow part thereof at least half or more "than half the whole diameter of the axle," the patentee mentioning several advantages as arising from this arrangement.

Thirdly, in strengthening the ends of hollow railway axles by "tubular pieces," this arrangement allowing the rest of the axle to be of thinner metal than usual.

Fourthly, in attaching a ring formed in two pieces, or other suitable piece of mechanism, to the nave of a railway wheel, in such manner as to form a support for the axle should the latter break near such nave.

Fifthly, in a mode of constructing solid as well as hollow axles, and affixing them to wheels. The ends of the axles are constructed so as to enter bell-mouthed tubes, into which they are keyed, the tubes themselves entering and being keyed within the naves of the wheels.

Sixthly, in "combining dies for forging or pressing necks at

"the ends of hollow axles." The mode of opening and closing the dies may be varied.

Seventhly, in a mode of making cranked axles for locomotives by welding several plates or sheets of iron or steel together which have been previously bent or cast into the cranked form.

Eighthly, in a mode of making hollow or solid axles with moveable necks, these necks being inserted into the open ends of hollow axles, or into holes formed in solid axles, and retained therein by a cotter or key, that part of the neck which enters the opening or hole being tapered in form, and the opening or hole being made to correspond therewith.

Ninthly, in the employment of cast steel as the material for hollow axles, suitable for locomotives and railway carriages.

[Printed, 10d. Drawing. See Repertory of Arts, vol. 1 (*enlarged series*), p. 331; London Journal (*Newton's*), vol. 23 (*conjoined series*), p. 11; and Mechanics' Magazine, vol. 38, p. 390.]

A.D. 1842, November 8.—N° 9515.

SPINKS, JOHN, the younger.—(*A communication.*)—"An improved apparatus for giving elasticity to certain parts of railway and other carriages requiring the same."

This invention consists "in substituting for the ordinary coach springs a metallic cylinder and a metallic piston, made to fit air-tight into the cylinder. Between the top of the cylinder and the piston such a quantity of atmospheric air or other permanently elastic gas is forced as to enable that compressed air, by means of the apparatus in which it is confined, to give elastic support to carriages, in lieu of the ordinary springs now in general use, and to give elastic resistance between carriage and carriage on railways, in lieu of the buffers now in general use."

In applying this apparatus as a bearing spring, the cylinder, which is inverted, is bolted to the frame of the carriage, and has a cover fitted thereto, the rod of the piston passing downwards through a cover bolted to the bottom of the cylinder, and its lower end being of convex form, and resting in a cup or concavity on the upper side of the axle box, the lower cover being furnished with a stuffing box, and the upper cover with a passage for the condensed air or gas, which is forced into the cylinder by a pump, the passage being furnished with a suitable valve inside the cylinder, and a screw plug by which it may be closed from the outside.

Between the lower side of the piston and the lower cover is an opening in the cylinder, through which air can pass to and fro as the cylinder rises and falls, and the upper side of the piston is furnished with a cup of leather, which serves as a packing, oil floating upon this packing, and both lubricating the cylinder and preventing the compressed air or gas from passing to the lower side of the piston. As applied to buffers, the arrangements are very similar, the cylinders, however, being placed horizontally, and being longer than in the other case, the convex ends of the piston rods entering into concave recesses in the ends of the buffer rods.\*

[Printed, 10d. Drawing.]

A.D. 1842, November 25.—N° 9526.

**RALLI, PANDIA THEODORE.**—(*A communication.*)—"Improve-  
ments in the construction of the framing and wheelwork of  
railway and other carriages, waggons, and carts, and of loco-  
motives and tenders."

This invention relates, firstly, "to a method of using and applying loose wheels to railway and other carriages, waggons, and carts." Each wheel is upon a separate axle, such axles being sustained in suitable framework, upon which the body of the carriage or waggon rests; the framework of one carriage being connected to that of another by projecting parts furnished with joints, and such joints being opposite the middle parts of such framing, this arrangement enabling a train of such carriages or waggons to pass with facility round curves in the rails.

According to another part of the invention, the main framework of a locomotive engine and tender is so constructed as to form in reality a single frame. The wheels of the engine are mounted in bearings in this frame, but those of the tender in a smaller frame, placed underneath the first, and connected therewith by a pivot; this enabling the engine and tender "to make any curve."

Another part of the invention consists in placing between the tender and the first carriage of a train a kind of frame mounted on wheels, and provided with a number of sets of springs, sliding bars connected respectively with the tender and the carriage being so arranged that, in the event of a sudden stoppage of the engine and tender, they act upon the springs and prevent the train of carriages from receiving any injurious shock.

supported by a bridle piece, which is bolted to the under part of the cast-iron box. This arrangement is adopted in order to keep the axletree in its proper place under the rollers, and prevent it from being disturbed by shocks or other causes which might tend to disarrange it. The bearing piece may be made hollow, so as to answer the purpose of a grease box (in the manner they are employed upon railways), by means of a small cylinder of cork or deal floating upon some oil, which is poured into the said hollow. The bearing is, however, maintained in contact with the axletree, which, as well as the two rollers, are by this means kept properly lubricated, the object of the invention being to reduce the friction of axles, and so cause carriages to travel more easily than usual.

The whole apparatus is surrounded by a case of thin sheet iron, which not only protects it from mud and dust, but also serves as a reservoir for an oil bath in case the hollow bearing piece mentioned above is not employed as a grease box, another sheet iron covering protecting the rim of the wheel.

[Printed, 10d. Drawing. See *London Journal (Newton's)*, vol. 24 (*conjoined series*), p. 82.]

A.D. 1842, December 29.—No 9580.

DE WYDROFF, BARON VICTOR.—“Improvements in the construction of railways, and in wheels to run on railways, and in apparatus for clearing the rails.”

According to that part of this invention which relates to wheels for railways, the wheels “are solid, and without spokes, from four to five feet in diameter,” “the sides of the wheel being made concave to enable them to resist the lateral motion of the carriages,” and the felloe of the wheel being concave, with one or two flanges, thus being suitable for travelling upon certain convex rails which form another part of the invention, the concavity of the wheel, however, being of greater radius than the convexity of the rail, and the wheel and rail thus only touching each other in one “mathematical point.” The wheels are loose on the axletrees, “in order that each of them may make its own revolution” independent of the other, and a grease box is described which “allows the oiling of wheels and axletrees at the same time,” this box being mounted on the outer end of the axle, but closely adjoining the nave of the wheel.

The apparatus for clearing the rails is composed of certain

frames mounted on wheels, of which the front pair are smaller than the others, this apparatus carrying an iron apron consisting of inclined surfaces arranged so as to throw on each side of the rails snow, earth, or such other substances as may be on the line, the rails being acted upon by scrapers which are pressed down upon them by springs, and by "little ploughs" which follow the scrapers, and a wire brush which follows the ploughs, the whole completing the cleansing of the rails. The apparatus also carries a sand box, from which sand is discharged upon the rails in front of the hinder wheels in order to prevent them from slipping, the bottom of the box being formed into an inclined plane to facilitate such discharge, which, however, may be stopped by means of a sliding door worked by a handle. That part of the apparatus which supports the sand box is suspended, by means of guard plates and springs, on the ends of the hinder axletree, these guard plates preventing the upsetting of the machine in case the axletree should break. On the back of the apparatus is a powerful buffer composed of an iron plate connected to rods capable of sliding to and fro, and furnished with a system of spiral and other springs, and the whole apparatus is connected to the train by means of ball and socket joints, the socket being in two parts kept together by weights; and two kinds of hooks are described which are intended to detach the apparatus from a locomotive in case of a shock or accident; these hooks being combined with certain rings and forked parts, from which they are apparently meant to become disengaged either by the use of a certain lever and cord or by the shock given to the apparatus, this part of the invention, however, not being very clearly set forth.

[Printed, 1s. 8d. Drawings. See *Mechanics' Magazine*, vol. 39, p. 45.]

A.D. 1843, January 26.—N° 9604.

McGETRICK, FRANCIS, and TENNANT, MATTHEW BAILEY.  
—"Improvements in apparatus for preventing the engines and  
"carriages from going off the railways, and for removing obstruc-  
"tions on railways."

One part of this invention consists "in applying sliding wheels,  
"made of cast iron or other material, to act in frames of cast iron  
"with grooves," fixed by any efficient means to the side frames  
of the leading carriage and to the tender following the engine,  
these "sliding wheels" consisting in reality of wheels mounted in



bearings capable of sliding up and down, such wheels being applied in addition to the ordinary bearing wheels of the carriage, and such wheels not only keeping their position on the rails while the other wheels rise over any obstruction which may present itself, but serving to sustain the carriage or tender in case of the failure of the ordinary wheels, or of the bearings or axles thereof.

Another part of the invention consists in the employment of rising and falling buffers, with concave and convex heads "acting" within each other in the form of cups and balls," which buffers may be used either in concert with the sliding wheels or otherwise, and may or may not be furnished with spiral springs, by which the effects of a collision may be mitigated.

Another part of the invention consists in the application of a "grated fender" so contrived as to remove articles from the rails which might obstruct the passage of the train, the patentee stating, in describing this part of the invention, that the front of the leading carriage of a train is to be "sharp pointed," or so as to offer little resistance to the atmosphere, but that the atmospheric pressure upon a certain platform extending on each side of the pointed front will cause an additional adhesion of the wheels of the carriage to the rails. How this latter effect is to be produced is, however, by no means apparent. A shoot for the discharge of sand upon the rails, and a broom for clearing the rails, are also described in connection with this part of the invention.

Another part of the invention consists in mounting the wheels of the tender and the leading carriage of a train upon "half axles," the wheels being either fast or loose thereon, and this arrangement affording facilities for passing round curves; the inner ends of these half axles being, moreover, furnished with balls working in sockets, which allow the outer end of the axle and the wheel to rise in passing over an obstruction.

Another part of the invention consists in the application of spiral springs, formed of steel and placed in cylinders of metal, as bearing springs for tenders and carriages, a flanged rod passing within the spring and resting upon the axle box.

Another part of the invention consists in placing between the ordinary buffers of a leading carriage or of an engine an extra buffer, composed of a "stuffed board" placed in front of an elliptic spring formed of a number of plates of metal, this extra buffer aiding the ordinary buffers in preventing the effects of collisions.

Another improvement consists in the use of a rail formed with a longitudinal channel or groove therein, such groove being filled with blocks of wood, which project above the surface of the rail, and form the bearing for the wheels of trains, the patentee stating that trains will be less liable to leave such rails than to leave rails of metal only, and will also travel upon the improved rails with less noise than usual.

[Printed, 10d. Drawing.]

A.D. 1843, April 20.—N<sup>o</sup> 9702.

**BODMER, JOHN GEORGE.**—"Certain improvements in locomotive steam engines and carriages to be used upon railways, in marine engines and vessels, and in the apparatus for propelling the same; also in stationary engines, and in the apparatus to be connected therewith for pumping water, raising bodies, and for blowing or exhausting air."

One part of this invention relates to axle boxes, steps, and frame cheeks, applicable for locomotive engines, tenders, and carriages. The frame cheeks, instead of being planed in the usual manner, are "turned out cylindrical," and the axle box is so formed as to fit between them "like a piston," the lower portion of this box being "turned out spherical below," and fitting and resting upon a "ball-shaped portion" of the step, the latter being "bored out cylindrical," but with the end of the opening which receives the end of the axle of rounded or hemispherical figure. The journal of the axle fits exactly into the step, "as well at its rounded end as at its shoulder," and, in order to prevent dust or dirt from getting between the shoulder and the step the nave of the wheel projects over the latter to a certain extent. A key is so inserted as to prevent the axle box from turning round, and the oil used for lubricating the axle passes from the axle box through holes in the centre of the rounded part of the step, by which means such oil is obliged to traverse the whole length of the journal before it can escape. By these arrangements the journal may be much longer than usual and yet fit perfectly into the step, the ball-shaped portion of the latter allowing it to "at all times accommodate itself to the motion of the frame."

Another part of the invention relates to the application of certain rail breaks to a tender or carriage. Mounted in bearings below the frame of the tender or carriage are two shafts on which

short arms or levers are fixed, connecting rods uniting the arms of one rod with those of another, and at the junctions of the rods and arms are also jointed the upper ends of bars, to the lower ends of which the breaks are connected, suitable brackets and projections guiding and keeping the bars and breaks steady. On one of the shafts mentioned above is also a lever to which is jointed a rod furnished with a rack, and in gear with the latter is a pinion fixed on an axis provided with a hand wheel, by turning which the breaks may be at any time pressed down upon the rails. These levers thus constitute "elbows," by means of which sufficient power may be exerted to lift the whole weight of the tender or carriage, and "transfer the pressure from the wheels to the breaks."

Another part of the invention relates to a rolling mill or machine so constructed as to roll or form the rims of railway wheels, as well as boiler and other plates. The rim rests upon small rollers mounted in connection with a horizontal table, and is maintained in position by guide rollers while operated upon by the principal rollers of the machine, which embraces a somewhat complex arrangement of slides, screws, and other apparatus, the details of which will only be understood with the aid of the Drawings annexed to the Specification, these details including a gauge roller and index "for indicating the sizes of rims, hoops, &c. under operation."

A furnace is also described in which wheel rims are to be heated for the purpose of welding before being taken to the rolling mill, and reference is made to a former Patent granted to the present patentee in connexion with this subject, on the 8th of September, 1842, a railway wheel being here described, the rim of which, having been brought into form partly by means such as described in the Specification of that Patent and partly according to the present invention, has holes drilled into it which are then tapped, the outer ends of the spokes of the wheels being screwed and then inserted into such holes, the spokes being bent about the middle of their length "for the purpose of yielding to the contraction of the nave when cast to the spokes," and such spokes being altered at the bends if necessary, should the contraction of the nave cause a deviation of the rim from its proper figure. The tyre may be placed upon the rim either before or after the nave is bored.

A.D. 1843, May 15.—N° 9724.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Certain improvements in the construction of boxes or axletrees of locomotive engines and carriages, and for the bearings or journals of machinery in general, and also improvements in oiling or lubricating the same."

The first part of this invention consists in forming axle boxes and the journals of shafts in general, as well as bearings for other mechanism, with "rims or fillets along their edges and at their ends, or at their ends only," according to circumstances, and then lining such boxes with a metallic composition or alloy "of which tin is the basis," the patentee stating that boxes thus prepared are less liable to the "heating and abrasion" than the boxes ordinarily used. The "rims or fillets" are meant to retain the lining in position, but a portion of such lining covers the edges of such rims or fillets, and so prevents contact between them and the surface of the axle or other mechanism moving within the box. Instead of rims or fillets "knobs, projections, or holes" may be so arranged as to retain the lining of the box, the lining being run into the latter in a melted state.

Another part of the invention consists in a mode of constructing oil boxes, applicable among other purposes to the axle boxes of railway engines and carriages. In the lower part of the axle box a chamber is formed, having a passage leading therefrom to the outside of the box, through which oil can be introduced, a kind of "double tube" being placed in this passage, which, while permitting the entrance of the oil, prevents it from being thrown out in case of concussion; the passage, moreover, being furnished with a suitable cover. In the chamber is mounted a weighted lever, the heavier end of which constantly keeps the other end raised within an opening in the upper side of the oil box or chamber, this end of the lever being provided with a flat cotton wick, or some other substance which serves, by means of capillary attraction, to convey a constant supply of oil to the axle, with which one part of it is in contact while the lower ends thereof dip into the oil in the chamber.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 6 (*enlarged series*) p. 290; London Journal (*Newton's*), vol. 25 (*conjoined series*), p. 27 vol. 27 (*conjoined series*), p. 220, and vol. 38 (*conjoined series*), p. 379; Mechanics Magazine, vol. 40, p. 237, and vol. 43, p. 156; Artizan, vol. 8, p. 199; Patent Journal, vol. 9, p. 220, and vol. 11, pp. 19 and 166; Meeson and Weisby's Reports, vol. 16, p. 139; Law Journal (*Exchequer*), vol. 20 (*new series*), p. 427 (*note*), and vol. 21 (*new series*), p. 305; Exchequer Reports, vol. 6, p. 331, and vol. 6, p. 869.]

A.D. 1843, May 16.—N<sup>o</sup> 9727.

KETTLE, JOHN LUCENA ROSS, and PROSSER, WILLIAM, junior.—“Improvements in the construction of roads and in carriages to run thereon.”

One part of this invention relates to constructing engines and carriages for use on railways with wheels having plain tires, and adapting them to run upon plain rails or trams of wood, such engines and carriages being prevented from leaving such rails or trams by the use of a central guide rail, and a flanged guide wheel mounted below the carriage or engine so as to travel immediately above such guide rail. And another part of the invention consists in mounting below engines and carriages guide wheels having V-shaped grooves, which are placed in an inclined position so as to be close to the inner corners of the rails or trams, the central guide rail being thus dispensed with, and these guide wheels supporting the carriage or engine in case of accident to the ordinary wheels or axles.

[Printed, 10*l*. Drawing. See Repertory of Arts, vol. 3 (*enlarged series*), p. 154; *Mechanics' Magazine*, vol. 40, p. 208.]

A.D. 1843, June 22.—N<sup>o</sup> 9795.

LE PAIGE, LOUIS.—(*A communication.*)—A “certain improved method,” or certain improved methods of “preventing accidents on railways.”

According to one part of this invention a ditch or trench is formed between the rails of a railway, and the engine and carriages of a train are each provided with a bar projecting downwards into this trench, and having placed upon it four arms, which are capable of turning upon the bar “as a centre;” the outer ends of these arms being provided with instruments somewhat like the flukes of an anchor, and certain springs being so arranged that when at liberty they force the arms into such a position as to cause these instruments to bear against or be forced into the sides of the trench, thus stopping or retarding the progress of the train, or, under certain circumstances, preventing it from leaving the rails. In order to prevent the apparatus from acting until required, certain rods furnished with T-heads are made to keep the arms in such a position as to prevent the instruments from touching the sides of the trench until, by some accident or collision, the rods are forced endwise so as to liberate the arms and allow the springs to act upon them, the engine and each carriage being provided with such a rod, and these rods

being in line, and one moving another in the event of collision. The apparatus of the locomotive, or of the last carriage of a train, is brought into action by a "fence plate," so that "anything" either striking or meeting the train before or behind" will produce the desired result, one "fence plate" being connected to the rod of the locomotive, and another to that of the last carriage.

The details of the invention may be varied. There may be, for instance, "one carriage peculiarly adapted to receive the grappling instrument coupled with every three carriages."

The invention also includes an arrangement by which the engine may be disconnected from the rest of the train, or one carriage from another, this arrangement consisting essentially in the use of a longitudinal rod, which acts in the manner of a buffer rod, and on being moved endwise, in the event of a collision or other accident, liberates the draw hook of the engine from the coupling chain of the carriage next to it, or the draw hook of one carriage from the coupling chain of another. Should the last waggon of a train (for example) be run into by the engine of a following train, such last waggon will be disengaged from the rest of the train. Arrangements are also described by which this disengagement may be effected by hand, through the medium of a lever connected with the draw hook.

[Printed, 1s. 8d. Drawings.]

A.D. 1843, July 26.—N<sup>o</sup> 9855.

EYRE, EDWARD.—(*A communication.*)—"Certain improvements in railways, and in the machinery or apparatus employed thereon."

One part of this invention relates to the construction of a driving wheel for locomotive engines, and consists in forming such wheel of a cast or wrought iron double rim or flange, supported from the boss or nave by ordinary radial arms, there being between the two flanges wood felloes, placed "with the fibres perpendicular or slightly inclined to the periphery of the wheel, and secured thereto by means of tree nails, bolts, screw bolts, and nuts, or any other suitable contrivance. These wood felloes form the working tyre of the wheel, the projecting rims forming flanges for preventing its quitting the rail." This wheel is meant to travel upon a central rail, laid down between the ordinary rails, and it is keyed upon an axle on which are also fixed two toothed wheels of different diameters, having chains



passing round them and also round similar wheels of different diameters, placed on the main crank shaft of the engine, "the small wheel on one shaft being placed opposite and working into the large wheel on the other," and the wheels on the crank shaft are provided with clutch boxes "for putting either one or the other of the wheels into gear, and so varying the power and speed of the driving wheel." At the ends of the axle of the driving wheel are also placed two wheels, running loose thereon, which assist in keeping the driving wheel, with the engine, in a vertical position, these wheels running upon the outer lines of rails and being flanged in the ordinary manner, and the central rail, on which the driving wheel works, is serrated or roughened, so as to cause the wooden tyre of that wheel to have greater hold thereon. This arrangement may be modified by using a driving wheel composed of metal and a wooden central rail, and the patentee mentions that by these means the boiler and engine may be mounted on separate carriages, and the weight of the two thus so distributed that lighter rails than usual will serve to sustain them. The wheels which run upon the outer rails are placed loosely upon parts of their axle which are partly conical and partly cylindrical, and provided with conical washers and nuts by which the positions of the wheels on the axle may be adjusted so as to compensate for the wearing of the insides of their bosses, such an arrangement being also applicable to the wheels of carriages in general.

According to one arrangement described, the engine, boiler, and tender are all mounted upon separate carriages having only two bearing wheels (in addition to the central driving wheel of the engine) these carriages being connected by central joints, and each passenger carriage of the train being also mounted on two wheels only, and jointed together through the medium of rods provided with springs, and capable of sliding to and fro, such springs serving the purpose of buffers, and the rods being also connected with levers and links by which when the buffers are brought into action brakes are pressed against the wheels, such brakes being either composed of wood and metal arranged in the ordinary manner, or of "tensile" bands, and the carriages are connected to their axles by means of "transverse springs" suspended from the latter by bolts, links jointed to the ends of the springs sustaining the carriages. These arrangements are meant to facilitate the passage of carriages round curves of very small radius, and another arrangement is mentioned as having



the same object in which the wheels of the carriages are each fast upon an axle, which, however, is divided into two parts, so as to allow the wheels to run independently of each other, and is sustained by framework so connected to the framing of the carriage by links and other apparatus as to allow of such framework assuming different angles with the carriage when the wheels are passing round curves. The patentee mentions a framework of this kind with wheels and axles as being "placed between all the carriages of a train," the ends of the carriages being connected thereto, and the ordinary bearing wheels being apparently dispensed with.

The details of this invention are somewhat complex, and will not be fully understood without the aid of the drawing annexed to the Specification.

[Printed, 10d. Drawing.]

A.D. 1843, August 17.—N° 9869.

LIPSCOMBE, FREDERICK.—"An hydrostatic engine, parts whereof are applicable as improvements to other engines, and other purposes; and also improvements in railway carriages."

One part of this invention consists in an improved brake for the retarding, checking, or preventing the motion of the wheels of railway carriages. The brakes, which are of the ordinary character, are brought into action by turning a screw which forces down a plunger in a certain cylinder, from which a pipe proceeds to a second and smaller cylinder containing a piston, there being between the plunger and the piston a quantity of oil, water, or other liquid, by which the movement of the plunger is communicated to the piston. At the end of the piston rod is a rack which is in gear with a pinion fixed upon a shaft passing across the carriage, and having upon it other pinions by which, through the medium of other racks and bars, the brakes are pressed against the wheels. The screw is turned, in applying the brakes, by means of a strap coiled round a drum which is fixed on the upper part of the screw, but is turned in releasing the brakes by a winch, the plunger being furnished with a helical spring which prevents the brakes from leaving the wheels when in action should the winch be left at liberty. These arrangements may be variously modified, and as many pistons and cylinders employed as may seem desirable, in accordance with the number of brakes in a

train, and straps, such as that mentioned above, passing from carriage to carriage and so causing the brakes of several carriages to act simultaneously.

Another part of the invention relates to the wheels of railway carriages, and consists in fixing "a thin sheet or covering of boards, or other of the lesser vibratory material, on each side of those wheels of railway carriages which are usually composed wholly of metal," such sheet of wood or other material being of equal dimension, or nearly so, to the space included between the inner side or edge of the tire and the inner side of the nave of the wheel, the unoccupied space between such sheets of boards being filled with straw, tar, lashing, felt, or other of the lesser vibratory substances for the purpose of preventing or lessening the vibration and noise of such wheels when in motion. The rest of the invention does not require notice here.

[Printed, 2s. 2d. Drawings. See *Mechanics' Magazine*, vol. 41, pp. 57, 113, 180, and 202; *Engineers' and Architects' Journal*, vol. 7, p. 114.]

A.D. 1843, October 5.—No 9887.

**BRIGGS, JOHN GEORGE.**—"Certain improvements in axles."

This invention consists "in forming axles of two pieces or shafts, one solid and the other hollow, the former fitting within the latter, by which combination much greater strength and less risk of breakage are obtained with the same quantity of metal than when the axle consists wholly of a solid or a hollow shaft."

One arrangement is described as suitable for railway axles, in which the two wheels are keyed upon an outer hollow shaft, through which a solid shaft is passed and keyed firmly therein, the ends of the latter projecting beyond the hollow shaft, and forming the bearings or journals of the axle. In another arrangement the solid and hollow shafts are of the same length, the bearings being formed of the outer ends of the latter. The shafts may be cylindrical, or of any other suitable form, and the invention is mentioned as being applicable to the axles of both railway and other carriages, and also to rotating shafts and axles of every description.

[Printed, 10d. Drawing. See *London Journal (Newton's)*, vol. 24 (continued series), p. 337; *Mechanics' Magazine*, vol. 40, p. 280; *Engineers' and Architects' Journal*, vol. 7, p. 154; *Practical Mechanics' Journal*, vol. 2, p. 201.]

A.D. 1843, October 5.—N° 9894.

**SAUNDERS, JONATHAN.**—"Improvements in the manufacture of tyres of railway and other wheels, and in the manufacture of railway and other axles."

This invention relates to "a mode of manufacturing the tyre of railway and other wheels by so piling steel with iron that the steel may be at those parts of the surfaces most liable to wear when the piles of steel and iron are rolled out into bars suitable for the tyre of railway and other wheels." The pieces of steel used are piled with the iron, and the pile heated to a welding heat, and passed under the hammer and formed into a bloom, and then passed between suitable grooved rollers and formed into a bar suitable for a railway or other wheel, in like manner to what is ordinarily practised when making tyre bars for railway or other wheels when only piles of pieces of iron are used.

The patentee does not confine himself to any particular arrangement of the parts of the pile, but remarks that he has in some cases covered the steel in the pile with a thin surface of iron, which is removed in turning the wheel.

By a disclaimer which was enrolled on the 4th of April, 1844, the patentee disclaimed that part of the title of this invention which is contained in the words relating to the manufacture of railway and other axles, stating that he had found the invention which he had intended to describe under those words to be wanting in utility.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 3 (*enlarged series*), p. 346; London Journal (*Newton's*), vol. 26 (*conjoined series*), p. 322; Mechanics' Magazine, vol. 40, p. 317; Engineers' and Architects' Journal, vol. 7, p. 152 (with Disclaimer).

A.D. 1843, November 7.—N° 9928.

**ROWAN, WILLIAM.**—"Certain improvements in axles."

This invention is described as being applied to the axle of a railway carriage, the patentee stating, however, that it may be applied to other purposes. The wheel is constructed as usual, and the axle, so far as regards the part between the wheels and their bearings, may be of any convenient form. Each end of the axle, is, however, somewhat prolonged, and slightly diminished in diameter, and mounted upon each end of the axle is a "friction cylinder or wheel carrier," this consisting of two rings placed

some distance apart, and connected by four longitudinal bars, each of which serves as an axis to one of four cylinders or wheels, these latter, in fact, working between the axle and the interior of a socket secured to the framework, and serving as antifriction rollers. The ends of the friction cylinders are bevelled or rounded off, and abut at such ends against correspondingly-shaped portions of the axle and bush, by which they are prevented from swaying to either side in working. A screw cap and nut further secure the whole in their places, and an external plate secures the socket from the entrance of dust. Conical instead of cylindrical friction wheels may be used if desirable.

[Printed, 8d. Drawing. See London Journal (*Newton's*), vol. 24 (*conjoined series*), p. 338; *Mechanics' Magazine*, vol. 40, p. 885, and vol. 41, p. 60; *Engineers' and Architects' Journal*, vol. 7, p. 198.]

A.D. 1844, March 19.—N° 10,112.

INGLIS, HUGH. — "Improvements upon locomotive steam engines, whereby a saving of fuel will be effected, which improvements are applicable to steam vessels and other purposes, and to the encreasing the adhesion of the wheels of railway engines, carriages, and tenders upon the lines of rail when the same are in a moist state."

[No Specification enrolled.]

A.D. 1844, March 20.—N° 10,115.

DE CHARLIEU, ANDRÉ DROUET. — (*A communication*). — "Improvements in rails for railways, and in wheels for locomotive carriages."

One part of this invention consists "in dispensing with the flange now applied to the wheels of locomotive carriages, to prevent the wheel from coming off the rails," as by an improved construction of rail the flange on the wheel is rendered unnecessary. The rails are furnished with flanges, which may either be cast or rolled along with the rails, or may be composed of separate pieces and united to the rail by bolts or pins, the inside of the flange (by preference) forming an angle with the upper surface of the rail of 105 degrees. The other parts of the invention do not require notice here.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 4 (*enlarged series*); p. 355; London Journal (*Newton's*), vol. 25 (*conjoined series*), p. 241; *Engineers' and Architects' Journal*, vol. 7, p. 407.]

A.D. 1844, April 18.—N° 10,145.

HEALE, EDGAR.—“ Certain improvements in the construction  
“ of carriages for the conveyance of passengers on roads and  
“ railways.”

This invention consists, firstly, in constructing the framing of the bodies of carriages in general of wrought-iron bars, welded together and covered with plates of metal, the metal plates forming the sides and ends may be embossed or stamped, and thus produce a novel and elegant appearance. A carriage is described as adapted for twelve inside and eleven outside passengers, being divided into three compartments, each capable of holding four persons, and such compartments being arranged at different heights from the ground in order to afford accommodation for outside passengers on the roof, but this carriage is meant for use on common roads only.

The second part of the invention relates to carriages to be used on railways, “ and is intended to prevent the dangerous consequences attendant on concussions, or the running of one train “ into another on the same line of rails.” The framing is composed of wrought iron, and the interior “ is formed of sheet steel “ or other metal bent into ovals,” which form a casing round each compartment of the carriage to be fitted up for the reception of passengers. By this means, should a concussion take place, the carriage, after the framing is broken up, will bear a considerable longitudinal pressure, and by its elasticity deaden the shock without injuring the passengers occupying the seats therein. “ Guard carriages,” composed of ovals mounted on wheels, may be attached to each end of a train, these carriages not conveying passengers, but acting in fact as buffers in case of a collision.

The third part of the invention consists in the construction of a wheel suitable for railway and other carriages. Within the tyre a series of wrought-iron rings of half the interior diameter of the tyre are placed over each other, their centres being at equal distances apart. To introduce the boss into the wheel portions of the circles are cut off, and the various parts are then fastened together in the form of a wheel, and placed in a furnace until sufficiently heated for welding. The wheel is then removed, and subjected to the operation of welding, which produces a strong and durable wheel, particularly calculated for all kinds of heavy

work, but suitable also, when made proportionably light, for carriages of all descriptions.

[Printed, 1s. 6d. Drawings.]

A.D. 1844, April 30.—No 10,168.

MELVILLE, JOHN.—“Improvements in the construction and “mode of working railways.”

One part of this invention consists in an improved construction of rail, and a mode of retaining the carriages thereon, by means of two horizontal wheels attached to the frame of the carriage, and running in a groove formed midway between the rails on which the carriages run, these being flat and composed of timber carrying iron plates, the carriage wheels being without flanges.

Another part of the invention relates to the driving wheels of engines, and consists in “constructing the periphery of the wheel “of wood, with the grain of the wood standing radially, and “coating the surface with a composition formed of silicious or “other suitable substances and glue, or other viscid and adhesive “matter,” this increasing the adhesion of the wheel to the rail.

A mode of constructing springs for buffers as well as bearing springs for carriages is also described as consisting in the employment of hollow spheres of caoutchouc placed within cylinders, and acted upon by pistons, blocks of wood being placed between the spheres when a number of the latter are used. Other springs are described as being composed of helical coils placed inside cylinders, to which they are attached at one end, while the other is attached to an axis passing through the cylinder, chains passing from these cylinders being connected to levers acting in combination with the buffer rods; or when such springs are applied as bearing springs, over blocks fixed on the axle boxes of the carriage. The tension of these springs can be regulated by turning the axes in the cylinders, which are provided with ratchets to prevent them from recoiling.

A brake is also described as consisting of a block of wood mounted in an iron case, open at the bottom, and capable of being pressed down upon the rails by means of a lever and screw, the block of wood being kept constantly in a wet state. A brake of this kind is described as being connected to the tender of a train, and this part of the invention also includes the use of metallic pipes, so connected as to be “capable of motion in all

" directions," as water pipes to pass between the tender and the engine, such pipes preventing the waste of water which occurs with flexible pipes.

Another part of the invention consists in a mode of preventing engines from running off the rails at curves, which is effected by " bringing down a horizontal wheel to act against the inner side " of the outer rail at those points," and another mode of effecting this object with both engines and carriages consists in placing a tram plate beside the " inner side of the inner rail," leaving only sufficient space for the flanges of the wheels.

[Printed, 1s. 2d. Drawings. See Engineers' and Architects' Journal, vol. 7, p. 421.]

A.D. 1844, May 7.—N° 10,173.

WRIGHT, JOSEPH.—(*A communication*).—" Certain improvements in railway and other carriages."

This invention consists, firstly, " in placing the bodies of railway carriages on two separate under frames, having eight, six, " or four wheels in each separate under frame," the latter being beneath the end portions of the carriage, the frame of which is strongly trussed, and the body of considerable length, " so as to " carry various classes of passengers and luggage," the framework of the carriage and the under frames being connected by " centre pins."

Another part of the invention consists in suspending carriages on springs, " which bear the load a certain distance from the ends, " which are only brought into gradual action by an increase in " the load," several modifications of this part of the invention being described, and such springs being applicable not only as bearing, but as buffer springs.

Thirdly, the invention consists in the substitution of wire ropes or bands for the iron band or brace covered with leather " as now " used on the Birmingham and other railways in connection with " ' Wharton's springs.' "

Fourthly, in forming wheels for railway carriages " by keying " L-shaped spokes in a cast-iron nave," the outer portions of the spokes forming the rim of the wheel, and the end of each entering a wedge-formed recess in the " bend " of that next to it.

Fifthly, in a mode of constructing wheels for railway carriages " by twisting the spokes longitudinally, so that at their insertion " in the nave they form an angle with the plane of the wheel;"



certain portions of these spokes being also so bent as to form the rim of the wheel, the end of one of these portions being welded to the angle or bend of the next.

And, sixthly, in a mode of bending or fluting the spokes of railway carriage wheels longitudinally, so as "to increase their strength, and cause them to offer an increased resistance to the contraction of the tyre." These arrangements are susceptible of various modifications.

[Printed, 10d. Drawing.]

A.D. 1844, May 14.—N° 10,181.

HILL, EDWARD.—"Improvements in the manufacture of railway and other axles, shafts, and bars."

This invention consists in constructing railway and other axles, shafts, and bars, of bars of iron "rolled into such form that the section thereof is a cross," the spaces between the parts of the cross being partially or wholly filled up with pieces of suitable form, and the whole welded into one bar by suitable means. If desirable steel may be used in combination with iron "either in forming the cross or centre bar or for the filling pieces."

[Printed, 8d. Drawing. See Repertory of Arts, vol. 5 (*enlarged series*), p. 34; London Journal (*Newton's*), vol. 25 (*conjoined series*), p. 317; Engineers' and Architects' Journal, vol. 8, p. 30.]

A.D. 1844, June 12.—N° 10,226.

POOLE, MOSES.—(*A communication.*)—"Improvements in wheels and axles."

According to one modification of this invention a wheel is constructed which has at the ends of the spokes a grooved rim, there being inserted into this groove blocks which compose the outer portions of the wheel. The grooved rim is formed by a flange projecting upwards at one side of the wheel, the other side of the groove being formed by curved plates, bolts securing the whole together. The "grain" of the wood radiates, and the blocks are rounded on the outside to prevent them from splitting, "heads" projecting from the inner sides of the groove and aiding in keeping the blocks in their places. The invention may be applied to wheels of the ordinary construction by using plates to form both sides of the groove, and bolting them to the rim of the wheel as well as to the blocks. These wheels appear to be meant only for use on common roads.

That part of the invention relating to axles consists in so arranging such axles that the wheels run loosely thereon, the axles being stationary, and is described more especially with reference to railway axles, the wheels being thus enabled to turn independently of each other in passing round curves in the rails. According to one modification of the invention pieces of steel are let into the lower side of the axle, these pieces "receiving the friction produced by the revolution of the wheel," rings being secured in the box of the wheel, which turn upon the said pieces. The nave of the wheel is recessed between the rings, such recess serving as a reservoir for lubricating material, which is introduced into such recess through an opening provided with a pipe and a stopper. A collar on the axle against which one side of the nave bears, and a washer which is placed on the other side, keep the wheel in its place. The mode of keeping the wheel in its place may, however, be varied, and instead of the axle being stationary it may revolve, and be furnished with rings of steel instead of having pieces on one side only, the nave in this case being furnished with either rings or separate pieces.

[Printed, 1s. 6d. Drawings.]

A.D. 1844, July 3.—N<sup>o</sup> 10,243.

**BODMER, JOHN GEORGE.**—"Certain improvements in locomotive steam engines and carriages to be used upon railways, in marine engines and vessels, and in the apparatus for propelling the same, and also in stationary engines, and in apparatus to be connected therewith."

One part of this invention relates to the "construction and material" of locomotive engine wheels. The rim, spokes, and nave of the leading wheels are cast of brass, of one piece, the spokes being tubular and the nave hollow, with partitions between the spokes. The driving wheels are of the same material and construction, except that there is a cast-iron nave, upon which the inner rim of the wheel is fixed, and for the purpose of adding strength to the inner rim small webs are cast between the tubular spokes. The patentee considers these wheels "to be almost equal in strength to those made of wrought iron, and having this advantage over them, that after they become useless as wheels that portion of them which is composed of brass is still worth nearly half its original value as old metal." The wrought-iron tyre is put on as usual.

Another part of the invention relates to a mode of working the breaks of a tender, this part of the invention being of the same character as that described in the Specification of the patent granted to the present patentee on the 20th of April, 1843, with the exception that the patentee here employs "direct levers instead of knees" and a right and left hand screw, for the purpose of pressing the breaks against the wheels. By the term "knees" the patentee apparently refers to certain arrangements termed in the former Specification "elbows." A brake such as that described in the Specification mentioned above is also here mentioned as being applicable to a locomotive engine without a tender, the present arrangement differing from that only in being connected by means of links with the axle boxes, and acting upon the springs of the engine when the brake is pressed upon the rails, "instead of acting upon the frame of the engine directly."

The other parts of this invention contain nothing which requires notice here.

[Printed, 4s. 6d. Drawings.]

A.D. 1844, August 29.—N<sup>o</sup> 10,301.

NEWTON, WILLIAM.—(*A communication.*)—"Improvements in "the means or apparatus for preventing shocks or accidents "on railways, or in lessening the dangerous effects arising "therefrom."

The first part of this invention consists in a mode of coupling railway carriages by means of two bars connected together by a joint. To the end of one carriage is bolted a frame, in which is mounted one of these bars, the latter being provided with collars which prevent it from moving longitudinally in the frame, but permit it to turn in its bearings for a certain distance. One end of the other bar is jointed to the outer end of this, the centre or fulcrum of the joint being a vertical pin, which can be removed when it is requisite to disconnect the carriages, and the other end of the second bar is connected to the next carriage of the train, the joint mentioned above allowing the apparatus "to bend in a "horizontal direction, thereby rendering the train flexible, which "will be found necessary when traversing curves." The second bar is not, however, rigidly connected to its carriage, but is furnished with a pin which is passed loosely into a vertical slot in a piece of metal attached to that carriage, this arrangement

preventing any inconvenience from arising through a difference in the height of the carriages. By this invention "the buffers and " connecting chains now in use are suppressed."

Another part of the invention relates to preventing the evil effects of the collision of one train with another, or with any other obstacle, and consists in the use of a double inclined plane of iron, mounted on wheels, and placed in front of and propelled by the engine, the inclined plane being furnished with rails of the same gauge as those upon which it runs. In case of a collision the engine will be forced up one side of this inclined plane, a connecting chain preventing the engine from going too far. The apparatus is pushed forward by rods or buffers attached to the engine, which act against similar rods or buffers attached to the inclined plane by means of a plate of metal capable of acting as a spring, which in the event of a collision bends back and allows the engine to pass over it. If desired, an ordinary carriage may be placed in front of the inclined planes, or the latter may be placed behind instead of before the engine.

[Printed, 8d. Drawings. See Repertory of Arts, vol. 6 (*enlarged series*), p. 237.]

A.D. 1844, September 12.—N<sup>o</sup> 10,317.

FLOCKTON, WEBSTER.—(*A communication*).—"Certain improvements in machinery or apparatus for sweeping or cleaning streets, roads, or ways."

This apparatus consists mainly of a large drum mounted in framework carried by wheels, and receiving motion through the medium of suitable gearing from one of the axles, the drum rotating vertically upon two concentric rings, and carrying levers provided with curved brooms, the latter being made to touch the surface to be cleaned at one part of the rotation of the drum, but being raised therefrom during the rest of such rotation by means of an inclined rail. Rakes, cutters, or scrapers may be arranged in front of the brooms, as also a vessel containing water for softening the material to be removed. The apparatus may be attached to the front of a railway engine or tender, and so clear the rails from dirt or snow. Clutches are provided by which the drum may be disconnected from the driving gear when necessary.

[Printed, 4d. No Drawings. See London Journal (*Newton's*) vol. 27 (*conjoined series*), p. 21.]

A.D. 1844, October 10.—N° 10,343.

**BROWN, JOHN BOWER.**—"Improvements in combining cast steel with iron, and in the construction of carriage springs."

The first part of this invention relates to the combination of cast steel with iron "when manufacturing railway tyre." A block of iron is in the first place heated "to nearly the point of fusion," and then placed in "a cast iron mould of such depth as to receive the iron and the cast steel to be combined therewith." Various modes of carrying out this part of the invention may be employed, the patentee stating that he does not claim the combination of iron and steel for railway purposes "when not in the manufacture of tyre for railway wheels."

Another part of the invention relates to springs, such as "are made up of series of plates which in action move or slide on each other;" one portion of this part of the invention consisting in "forming channels, grooves, or recesses in the surfaces of the plates, to contain grease or other lubricating matter." And a third part of the invention consists in forming carriage springs "of two widths of plates, in place of having all the plates of one width, as heretofore," the effect of this arrangement being that "the spring will not have so much extent of rubbing surfaces between the plates as when the plates are all of one width," by which "a very beneficial result will be obtained."

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 5 (*enlarged series*), p. 30; London Journal (*Newton's*), vol. 28 (*conjoined series*), p. 112; Mechanics' Magazine, vol. 43, p. 58; Practical Mechanics' Journal, vol. 3, p. 091; and Engineers' and Architects' Journal, vol. 8, p. 264.]

A.D. 1844, October 22.—N° 10,358.

**NASMYTH, JAMES, and MAY, CHARLES.**—"Improvements in working atmospheric railways, and in machinery for constructing the apparatus employed therein."

One part of this invention consists "in applying the pressure of the atmosphere to the movement of a piston acting on the brakes of carriages, in order to arrest the progress of such carriages on atmospheric railways." Upon the carriage, or some part of the framing thereof, is placed an air-tight vessel, from which the air is exhausted by suitable means, this vessel having communication with a cylinder fitted with a piston, one side of which is open to the atmosphere, the rod of the piston being attached to a lever capable of actuating a brake. The

communication between the air-tight vessel and the cylinder is regulated by means of a stop cock, which, being opened, the piston "acts with force upon the lever of the brake." The stop cock may also be so arranged as by a further movement to admit air behind the piston, a spring or weight then driving the piston back, "so as to release the brake." In the case of a train composed of a number of carriages one large vessel, "with a proportionate air pump," may communicate with a cylinder fixed upon each carriage, the brakes of all the carriages of the train being thus brought into action simultaneously.

[Printed, 10d. Drawing. See Repertory of Arts, vol. 5 (*enlarged series*), p. 345; Mechanics' Magazine, vol. 42, p. 430, and vol. 43, p. 136; and Engineers' and Architects' Journal, vol. 8, p. 100.]

A.D. 1844, November 9.—N° 10,387. (\* \*)

PROSSER, WILLIAM, junior.—"Improvements in the construction of roads, and in carriages to run thereon."

The first part of this invention consists in "a mode of constructing roads with tramways of wood, and also combined with guide rails for the guiding carriages thereon." The rails for the reception of carriage wheels have each a flat surface, and the "guide rail" passes between them, each carriage being furnished with a wheel having a flange on both sides, which runs over the guide rail with its flanges at each side thereof, the carriage being thus prevented from leaving the proper track.

Another part of the invention consists in furnishing the carriages with grooved wheels, (in addition to those which support the body of the carriage,) so placed that the grooved portions run against or near the inner edge of each outer rail, the guide rail being dispensed with, and these grooved wheels serving to keep the carriage in its proper course. These grooved wheels may also be applied to a locomotive engine.

[Printed, 10d. Drawing. See Engineers' and Architects' Journal, vol. 8, p. 171.]

A.D. 1844, November 14.—N° 10,394.

FARRELL, ISAAC.—"Certain improvements in machinery where-  
" by carriages may be impelled on railways and tramways by  
" means of stationary engines or other power, including certain  
" apparatus connected with the carriages to run on same."

This invention relates chiefly to a mode of propelling railway



carriages, by means of a screw propeller, which is laid down between the lines of rails on which the carriages travel, such propeller being put in motion by stationary engines, and acting upon the carriages through the medium of certain wheels, some of which serve as propelling and others as "check" wheels. There are two parts of the invention, however, which require notice here. One of these consists in a mode of applying breaks to the wheels of carriages, in which the breaks are connected to rods jointed to arms fixed on cross shafts in the ordinary manner, but the cross shafts are provided with other arms or cranks, to which are jointed the lower ends of long connecting rods, which proceed upwards and are jointed at their other ends to a cross beam. This beam has an opening in the middle through which a screw passes loosely, there being below the cross beam a nut on the screw, which, by turning the latter, is gradually brought upwards against the beam, and, by raising that and the connecting rods, presses the breaks against the wheels. The other part of the invention alluded to consists in furnishing the carriages with horizontal guide wheels, mounted on vertical bars or axes projecting beneath them, and such guide wheels being concave on their circumferences, so as to work in due contact with each side of a cylindrical guide bar or tube, fixed between the rails but being much higher than the latter, this arrangement rendering flanges on the carriage wheels unnecessary. When a tube is employed it may be used for signalling purposes.

[Printed, 1s. 4d. Drawings. See Repertory of Arts, vol 6 (*enlarged series*), p. 10; Mechanics' Magazine, vol. 42, p. 129; Engineers' and Architects' Journal, vol. 8, p. 120.]

A.D. 1844, December 2.—N° 10,411.

**JAMES, WILLIAM HENRY.**—"Certain improvements in carriages  
"for the conveyance of passengers and goods, and in the means  
"of working the same."

One part of this invention only requires notice here, this consisting in the application of a "spring governor" for the purpose of regulating the movements not only of railway locomotives but of carriages also. This spring governor consists essentially of an upright shaft which is made to revolve by suitable means in suitable bearings, and has at some distance from the upper end horizontal arms which project for some distance on each side of it, there being upon each of these arms a weight capable of sliding



to and fro thereon. At or near the end of each arm is a projection or collar, and between the collars and weights are spiral springs, which, when the apparatus is at rest, keep the weights near to the upright shaft. On the rotation of the latter, however, the centrifugal force of the weights causes them to move towards the ends of the arms, thus compressing the springs, and by means of four connecting rods which are jointed to the weights, and also to certain tubes on the upright shaft, one of which is placed above and the other below the arms, such tubes are also made to slide, one upwards and one downwards on such shaft, the tubes being also made, if desirable, to act against spiral springs placed on the shaft, and the amount of movement of the weights and tubes varying with the velocity of the shaft, and the consequent variation in the centrifugal force of the weights. This apparatus is described more particularly as applied to regulate the action of certain propelling apparatus connected with the engine and carriages of a train, the movements of the tubes causing corresponding movements to be given to certain levers forming part of such apparatus, but the patentee claims this governor whether it be applied to apparatus such as described by him, "or applied to engines and carriages worked by any other method, and on any sort of carriage way, for the purpose of regulating the movements thereof." It is of course obvious that such a governor might be made to apply breaks to the wheels of a railway train, or to those of the wheels of a carriage on an ordinary road, on the speed of such train or carriage becoming excessive.

[Printed, 1s. 4d. Drawings.]

A.D. 1845, February 10.—N° 10,514.

MABERLY, FREDERICK HERBERT.—"Certain improvements  
" in machinery or the apparatus for stopping or retarding railway  
" or other carriages, applicable also for these purposes in regard  
" to other engines or wheels."

According to this invention, arrangements are made by which a break or breaks may be applied simultaneously to any or all of the wheels of the carriages of a train, when, "by the tortuous or  
" curvilinear course of a railway, such carriages make or form  
" considerable angles of inclination with each other, and this  
" whether such angles of inclination are horizontal or vertical."  
The carriages are connected together by means which not only

afford facilities for applying the break or breaks, but which also prevent the carriages from leaving the rails, the connections of the carriages affording them free motion in every direction within certain limits, and such motion compensating for "the play or action of the springs of the engine and the tender," the arrangements being also such as to enable an attendant to apply the breaks either by means of a lever, or "screw of quick action," or both; or the engineer to apply the "power of the engine for such purpose," whereby not only may the engine be stopped, but the breaks of the whole train brought into action.

The invention is described at great length, and embraces a multitude of details of which no description will convey an adequate idea without the aid of the drawings annexed to the Specification, levers, cranks, chains, straps, riggers (cogged and otherwise), racks, clasps, springs, rods, inclined planes, and other mechanism being introduced in profusion, and in various combinations. The carriages are connected by universal joints and loose chains, and may or may not be provided with buffers, and the bodies of the carriages are mounted upon an upper and an under frame, the former being capable of moving to some extent upon the latter, and thus reducing the effect of collisions upon the passengers, such movement also bringing the breaks into action, the latter being also brought to bear in the case of a train passing along curves or undulations in the line, through the medium of links and other apparatus, by which the breaks of one carriage are connected to those of another. The engine is caused to apply the breaks by means of riggers mounted upon the axle of the driving wheels, and furnished with endless chains giving motion to other riggers, from which rods proceed to apparatus by which the carriage breaks are brought into operation, and the engine may also be provided with riggers and crossed straps or chains, by which the wheels of the engine are made to "break each other," as well as to "concur in breaking the train."

The invention also includes a mode of constructing a footboard on which the engine driver may stand, such footboard being capable of sliding backwards and forwards, and so obviating to him the effect of collisions and sudden stoppages. Also the application of an "apron" in front of the engine, which will either take up any person or thing lying on the rails, or catch any person who may be thrown from the engine; and the application of curtains of thick leather or sheet iron or other material along

the sides of the carriages of a train, which curtains will receive and preserve persons who may accidentally fall from such carriages.

The Specification of this invention is by no means satisfactory, the vague and irregular manner in which the invention is described rendering it impossible to understand with certainty what it is that the patentee really claims, many of the details being of extremely trivial character, and the whole Specification being calculated rather to confuse the reader than otherwise.

[Printed, 2s. 2d. Drawings. See Engineers' and Architects' Journal, vol. 8, p. 298.]

A.D. 1845, March 18.—N<sup>o</sup> 10,571.

RAYNER, HENRY SAMUEL.—“Certain improved means of  
“preventing accidents to carriages on railways and common  
“roads.”

This invention consists “in protecting carriages on railways  
“and common roads from such accidents as arise from collisions  
“with other carriages or solid bodies, and this by means of a  
“buffing apparatus attached to one or more or to each of such  
“carriages, or placed in suitable situations in relation to them,  
“which apparatus depends for its action on the elastic properties  
“of air and water, and opposes a resisting power proportional to  
“the weight and velocity of anybody acting upon or striking  
“against it.”

An arrangement is described in which an outer cylinder is attached to the framing of a railway carriage, and has within it a cylinder composed of two longitudinal portions separated by a diaphragm, the inner cylinder, however, projecting to some extent from, and being capable of sliding to and fro within the first. The outer portion of the inner cylinder is filled up with wood, the next portion, behind the diaphragm, is filled with water, and this portion also encloses a piston, the rod of which passes through and is secured behind the outer cylinder. This piston is thus fixed, and is provided with a number of holes, and the result of the arrangement is that on the buffer head, which is fixed upon the outer end of the inner cylinder, being forced inwards, the water in the inner portion of the inner cylinder is driven through the holes in the piston, the resistance offered to the passage of the water through such holes, together with the compression of

the air in the outer cylinder by the entry of water therein, affording an elastic medium of resistance to the action of the buffer.

This arrangement may be variously modified, and the invention adapted for stationary buffers as well as for those of moving vehicles. The piston in some cases may be moveable, and the water and air chamber stationary, and the whole apparatus may be mounted, if desirable, upon an "independent buffer carriage."

[Printed, 1s. Drawings. See Engineers and Architects' Journal, vol. 8, p. 330; Mechanics' Magazine, vol. 43, p. 241.]

A.D. 1845, April 7.—N<sup>o</sup> 10,601.

**BURY, EDWARD.**—"Certain improvements in locomotive engines, carriages, or waggons running upon railways or common roads, for the prevention of accidents."

[No Specification enrolled.]

A.D. 1845, April 14.—N<sup>o</sup> 10,609.

**HADDAN, JOHN COOPE.**—"Improvements in preparing sleepers, chairs, and spikes, and constructing wheels for railways."

The improvements in wheels for railways relate, firstly, to such wheels as are composed of cast-iron frames or bodies, with wrought-iron tyres or hoops around them, and consist in "casting such frames or bodies with divisions or openings through the peripheries, and extending through the frames or bodies towards the naves, such openings being in certain cases afterwards partly or wholly filled with iron, wood, or other suitable material." Various modifications of this part of the invention are described, and another improvement in railway wheels is described as relating to such wheels as have "the peripheries of the frames or bodies formed of segments of a circle, with spaces or openings between such segments," this improvement consisting in "running cast iron or other suitable metal in a fluid state into such spaces or openings," the object of both parts of the invention apparently being to bind the different portions of the wheel firmly together, while retaining a certain degree of elasticity in such wheel. The invention also includes an arrangement of apparatus whereby the form of the frames or bodies of wheels having divided peripheries is preserved during the insertion of wedges or pieces of wood, this apparatus consisting essentially of a circular plate, furnished

with fixed projections and certain moveable blocks provided with pins.

[Printed, &c. Drawings.]

A.D. 1845, July 3.—N° 10,750.

**WALKER, THOMAS, and MILLS, GEORGE.**—"Certain improvements in springs and elastic power, as applicable to railway carriages and other vehicles, or to any other articles or purposes for which springs or elastic power is now used."

According to one modification of this invention air-tight bags, filled with air or gas, are enclosed in cylinders, and pistons are arranged in such cylinders so as to act upon and compress such bags and the air or gas within them, the buffer heads being attached to the rods of such pistons. In other modifications of the invention springs are substituted for bags of air or gas, one "important part" of this invention being mentioned as the combination of atmospheric air with confined spiral springs.

Various combinations of the mechanism mentioned are described, the mode of applying ammoniacal gas as well as atmospheric air being fully set forth.

[Printed, &c. Drawing. See Engineers and Architects' Journal, vol. 9, p. 61.]

A.D. 1845, July 29.—N° 10,790.

**BROWN, SAMUEL.**—"Improvements in the formation of embankments for canals, docks, and sea walls, and in the conveyance and propulsion of locomotive engines and other carriages or bodies on canals and other inland waters, and also on rail and other roads, and in propelling vessels on the ocean and navigable rivers."

One part of this invention consists in mounting railway carriages upon wheels of much larger diameter than those ordinarily used, the axles of the wheels being each in two parts, allowing the wheels to revolve independently of each other, and the main portion of the body of the carriage being below the axle, thus preventing that tendency to oscillation to which railway carriages as ordinarily mounted are liable. The wheels of the carriages are without flanges, and are maintained in position on the rails by means of guide wheels, the latter being arranged differently to the guide wheels generally used, being enclosed in

wrought-iron boxes which only allow a small portion of each wheel to project therefrom in order to impinge against the rail. The spindle of each wheel is also so arranged in combination with a spring as to be capable of moving up and down, and so giving way to accidental obstructions without tending to throw the carriages off the rails.

The two parts of each axle are united about midway of the carriage by means of bolts and flanges, the end of one part being conical, and working in a conical recess in the end of the other.

The other parts of the invention contain nothing which requires notice here.

[Printed, 1s. Drawings.]

A.D. 1845, August 7.—N<sup>o</sup> 10,808.

SMITH, HENRY. — "Improvements in the manufacture of wheels for railways, and in springs for railway and other carriages, and in axle guards for railway carriages."

This invention consists, firstly, in making the rings or hoops for railway tyres "in a mass in place of making a bar and joining the two ends by welding." This may be effected by coiling a bar helically round a mandril, or piling rings or other forms of iron, and then welding the whole together, combining steel therewith when necessary.

Secondly, in a mode of making wrought-iron naves for railway wheels by forming the inner ends of certain bars which when bent constitute the spokes of a wheel with "enlargements" thereon, which when welded together form a complete nave.

Thirdly, in the employment of grooved rollers to so act upon the tyres of railway wheels as to supersede the necessity for turning such tyres, or at least to "reduce the quantity of turning necessary," the position of such rollers being regulated by screws and stops.

Fourthly, in a mode of shrinking tyres "on to wheels with greater truth," which consists in first forcing the wheels into certain "cones" before receiving the tyres, and again forcing them into a similar but larger cone after the tyres have been shrunk thereon.

Fifthly, in another mode of effecting the same object by the use of moveable segments actuated by excentrics or by other similar means.

Sixthly, in an improvement in the hydraulic presses used for forcing railway wheels upon their axletrees, this consisting in the use of an "interposed cylinder," placed between the working cylinder and the pump or pumps, the interposed cylinder being provided with a ram, and the result of the arrangement being that a store of water is always at command "under the required pressure to fill the working cylinder."

Seventhly, in turning the outer peripheries of railway wheels while in a heated state, such state facilitating the turning.

Eighthly, in facilitating the making of axletree guards, by sawing the plates of which such guards are composed "into the proper shape whilst hot."

Ninthly, in certain modes of bending the plates of metal intended for the springs of railway and other carriages, one of which consists in the use of a plate carrying moveable stops in concert with a second plate carrying moveable bars, such stops and bars being arranged in any desired curve, and the plates being pressed between them; while another mode consists in the use of rollers arranged in a manner similar to those employed in bending the metal for tyres.

[Printed, 1s. 4d. Drawings. See Macrory's Reports, p. 232.]

A.D. 1845, October 6.—N° 10,854. (\* \*)

CRAMPTON, THOMAS RUSSEL.—Arrangement of locomotive.

1. Combines an upright tubular boiler with the tender, having outside cylinders in one frame.

2. Uses external cranks or returned eccentrics projecting from the crank pin for working the slide valves, instead of eccentrics framed outside the wheels.

3. Alters the shape of the fire-box to increase the length of the tubes and extend the area of the fire-grate, by contracting the top of the fire-box longitudinally, or by bringing the tubes into the fire-box.

4. Places a wooden rail outside the ordinary iron rail on which the driving wheels run, while the iron wheels run on the iron rail, the tire being increased in width to run on the wooden rail.

[Printed, 6d. Drawing. See Repertory of Arts, (*enlarged series*), vol. 8 p. 17; London Journal (*Newton's conjoined series*), vol. 28, p. 241. Engineers' and Architects' Journal, vol. 9, p. 220. Enrolment Office.]



A.D. 1845, October 23.—N° 10,892.

**WORSDELL, THOMAS, junior.**—"Certain improvements in apparatus to be attached to and employed in connection with railway carriages."

One part of this invention consists in an improved construction of apparatus to be applied to railway carriages for protecting the passengers from injury in case of collision, which apparatus consists of "a padded shield placed across the front end of the carriage, and so mounted that in case of a collision it shall fly up and cover the glass in the front part of the carriage."

The padded shield is arranged to slide up and down upon guide rods, and is raised suddenly in case of a collision by cottars in the buffer rods striking against a cross bar carrying a rack, which by means of a sector, a vertical rack and bar, and certain arms forces the shield upwards.

Another part of the invention relates to a "jack" for lifting railway carriages and other heavy bodies, but this part of the invention is noticed in the series of Abridgments relating to raising, lowering, and weighing.

[Printed, 10*l*. Drawings. See London Journal (*Newton's*), vol. 30 (*continued series*), p. 15.]

A.D. 1845, October 23.—N° 10,894.

**FULLER, WILLIAM COLES.**—"Improvements in the construction of carriages for railways."

The first part of this invention consists in "the application of cushions, with or without springs, to the ends of railway carriages," these cushions covering the whole or the greater part of the ends of the carriages, and being mounted on frames capable of sliding to and fro, and provided or not with springs, and such cushions being used to obviate the effect of collisions, either in conjunction with ordinary buffers or otherwise.

Another part of the invention consists in the employment of india-rubber in the construction of both buffer and bearing springs. For buffer springs the india-rubber is formed into discs, a number of which are placed in the buffer rods, being prevented from binding upon the latter by the holes in the discs being of much larger diameter than the rods, and such holes being further provided with discs of metal. For the bearing springs of carriages

a long rib or strap of india-rubber may be used, the body of the carriage being suspended upon this by means of teeth or rods connected thereto pressing upon the strap, and the latter being supported by other teeth or rods connected with apparatus mounted on the axle boxes; or layers of india-rubber may be placed between the framing of the carriage and the axle boxes, such layers being connected by sliding rods, or cords, or pieces of india-rubber passed through holes made in them, and metal plates, if desirable, being interposed between the layers; or such springs may be each composed of one solid piece of any convenient shape.

[Printed, 1s. Drawings. See Repertory of Arts, vol. 9 (*enlarged series*), p. 87; London Journal (*Newton's*), vol. 27 (*conjoined series*), p. 292, and vol. 29 (*conjoined series*), p. 10.]

A.D. 1845, October 31.—N° 10,901.

**BRANDLING, ROBERT WILLIAM.** — "Improvements in rail-ways and railway carriages for the security and convenience of the public."

This invention consists, in the first place, in a mode of keeping the wheels of railway carriages constantly upon the rails "by the application of counteracting pressures in opposite directions, and by means that do not cause any violent shock in resisting any deviation from that position of the train where the weight is equally distributed on the two rails." This is effected by means of a horizontal cross bar connected to the framing of the carriage, and projecting on each side beyond the latter, the ends of the bar running close under inverted segments of rails, carried by posts on each side of the ordinary line of railway.

The rest of the invention relates to propelling railway trains by means of endless ropes and apparatus in connection therewith, and contains nothing which requires notice here.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 7 (*enlarged series*), p. 341; Patent Journal, vol. 1, p. 46; Engineers' and Architects' Journal, vol. 2, p. 126.]

A.D. 1845, October 31.—N° 10,905.

**FORSYTH, THOMAS.** — "Certain improvements in signals, or in the method of giving signals, which are applicable to the working on railways, and which are also applicable to maritime purposes, and for certain other improvements in the working of railways."

That part of this invention which requires notice here consists, in the first place, in the application to the wheels of railway engines, tenders, and carriages of "wind guards," or casings so contrived as to prevent currents of wind from having contact with the revolving surfaces of the wheels, these carriages being intended to prevent such currents of wind from retarding the progress of a train to the extent which they would otherwise do.

Another portion of this part of the invention consists in "the application of catches or of other convenient means to spring buffers, so as to prevent their recoil when necessary," the patentee stating that he considers such recoil after a collision to be more injurious to the passengers by a train than the collision itself.

Another branch of this part of the invention consists in forming the lower framing of railway carriages and waggon in two portions, which are so connected through the medium of an universal joint that not only is the framing enabled to adapt itself to any curves which may occur in the line of rails, but the wheels themselves are allowed to follow inequalities in the height of the rails.

[Printed, 2s. 10d. Drawings.]

A.D. 1845, October 31.—N° 10,906.

CRAWFORD, DALRYMPLE.—"Certain improved means of, or machinery for, arresting the progress of railway carriages and trains."

According to one part of this invention a cylinder is mounted upon a break carriage, and has within it a piston, to the rod of which a cord or chain is connected and coiled upon a barrel, by turning which the piston may be drawn from one end of the cylinder to the other. At each end of the cylinder is a cock, and that at one end being closed and the other opened and the piston being drawn from the former towards the latter, a vacuum is thus created behind the piston, the air in front of the latter passing out through the open cock, which is then also closed. On the axis of the barrel is a spur wheel, by which, through the medium of other wheels and an upright shaft, with another drum and cord or chain and certain levers and cams or other suitable apparatus connected with the breaks, the latter may be brought into action upon the carriage wheels, which is effected when necessary by opening the

cock in front of the piston and allowing the air to press it backwards in the cylinder, the cord or chain attached to the piston rod then giving motion to the whole apparatus in connection therewith. The second cord or chain operates upon the break apparatus through the medium of a spring, and a second spring is so arranged as at once to remove the breaks from the carriage wheels on the wheel first-mentioned being placed out of connection with the rest, for which provision is made. A weight may, if desired, be used in place of the second spring. As mentioned above, this apparatus is applied to a "break carriage," and the breaks of the other carriages of a train may be acted upon by an arrangement of pulleys and chains, by which a connection is formed between the break carriage and the rest. Instead of the cylinder and piston a spiral spring may be used ; or compressed air might be caused to act upon such piston.

According to another part of the invention a long lever is provided with a moveable weight, the latter being provided with wheels, and when drawn towards that end of the lever farthest from the fulcrum, which is effected by means of a chain and a winch, causing the lever to act upon the break apparatus and so press the breaks upon the carriage wheels.

Another part of the invention consists in facing the breaks with either solid casings of wood, or with wood having holes therein filled up with chalk or "some gritty composition," the object being to increase the power of the breaks. A vessel containing some liquid for moistening and cooling the break is also connected thereto.

Another part of the invention consists in a mode of causing "the entire weight of the carriage to be subservient to the purposes of a break." The frames containing the axle boxes are not rigidly attached to the frame of the carriage, but so that the latter may be raised or lowered therein by the use of screws, levers, and other appliances, and the breaks are "rail" breaks, connected to the frame of the carriage by springs, and pressing upon the rails when such frame is lowered.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 44, p. 337; *Engineers and Architects' Journal*, vol. 9, p. 186.]

A.D. 1845, November 11.—N° 10,932.

DONKIN, BRYAN.—"Certain improvements on wheels as applicable to railway carriages, and on the mechanical contrivances

" by which railway carriages are made to cross from one line of  
" rails on to another line, or on to what are generally called  
" sidings."

This invention consists, firstly, in an improvement in the exterior of the peripheries or circumferences of the rims of railway wheels, having cylindrical and conical forms combined together in the rim of the same wheel, " only part of the breadth of that  
" rim nearest to the projecting flange being conical, but the other  
" part of the same breadth being cylindrical, and such wheels  
" being so adapted to the rails on which they are to run as that  
" the said cylindrical parts will extend over a large portion of the  
" breadth of the upper surfaces of the rails, and the conical parts  
" over a small portion of the said breadth;" the patentee stating that by these means the properties of cylindrical and conical wheels are so united as to give the wheels "a tendency to keep  
" themselves laterally in place on the rails, and avoid running  
" off, particularly at curved parts of the lines of railway."

The rest of the invention relates solely to certain modes of working the switches of railways, and is noticed in the series of Abridgments relating to the latter.

[Printed, 2s. 2d. Drawings.]

A.D. 1845, November 18.—N<sup>o</sup> 10,949.

WARD, FREDERICK OLDFIELD, and HILLES, MALCOLM WILLIAM.—"Improvements in the construction of railways,  
" and in machinery and apparatus for working carriages thereon."

One part of this invention relates to buffers in which a piston working in a cylinder is connected to the buffer rod, and compresses the air inside such cylinder upon the buffer coming into action, and the improvement consists in forming a hole in the cylinder about midway of its length, through which air may pass to either side of the piston according to the position of the latter.

Another part of the invention consists in suspending between two carriages of a railway train a large sledge, the latter being connected to the carriages by means of links or rods, so arranged that when the carriages are travelling at a proper distance asunder they keep the sledge raised from the rails, but on being brought too near together through a change of the speed of the engine or otherwise the sledge descends, and not only acts as a skid upon the

rails but as a break upon the carriage wheels, thus preventing the carriages from coming into contact with each other.

(Printed, &c. with Drawings.)

A.D. 1845, November 18.—N° 10,951.

VAUX, CHRISTOPHER.—(*Partly a communication.*)—"Improvements in apparatus or machinery for preventing accidents to carriages and passengers on railways, parts of which improvements are applicable to save lives and property on other places."

According to the first part of this invention the locomotive engine of a train has suspended from it two levers, the lower ends of which are meant, when requisite, to come into contact with an instrument or instruments placed between the rails of the line of railway on which the engine may be travelling, the result being that one lever is then made to act upon the whistle of the engine, through the medium of a chain and handle, and so cause such whistle to be sounded, while the other lever liberates a pulley round which a chain is passed, and which chain, through the medium of a spring and another pulley, is made to cut off the steam from the engine by closing the steam valve, the last-mentioned pulley being fixed on the axis of such valve. This chain is an endless chain, and passes not only around the pulleys already mentioned but also around a third pulley, which, however, only serves as a carrier or guide pulley. Instead of chains, straps or cords may be used in both the arrangements mentioned above.

Another part of the invention relates to apparatus which is to be arranged along the line of railway for the purpose of operating when necessary upon the levers mentioned above, as well as upon mechanism by which the brakes of a train may be brought into action. A truck forming part of a train is described as having below it levers or arms which are capable of being placed either in a horizontal or vertical position, and when in the latter of coming into contact with certain levers arranged between the rails, and, by moving them and certain rods, wires and other apparatus connected therewith, raising two arms, which are mounted upon a small shaft, into a vertical position, one of these arms being then ready to operate upon the levers of the next advancing locomotive, and so sound the whistle and cut off the steam of that locomotive on its arrival, while the other of these



arms will at the same time cause the brake apparatus of the train drawn by such locomotive to be brought into action, by moving a lever or levers connected with such brake apparatus, the latter being itself of the ordinary character. These arrangements are described at considerable length, the main object being to prevent trains passing along the same line of rails from approaching too near each other, and this being accomplished by placing at suitable intervals along the line apparatus such as described above. The details of these arrangements are somewhat complex, and embrace the use of a number of levers, rods, wires, sliding bolts, inclined planes, and other mechanism, the precise operation of which will only be understood with the aid of the numerous figures in the drawings annexed to the Specification. Apparatus of a similar character may also be used to "give notice to distant places of the coming of the train."

[Printed, 3s. 4d. Drawings.]

A.D. 1845, November 18.—N<sup>o</sup> 10,957.

POWELL, HENRY BUCKWORTH.—"Certain improvements in carriages to be used on rail and other roads."

This invention consists, in the first place, in "constructing the bodies of the carriages or waggons quite separate and moveable from the carriage beds or trucks thereof, so as to enable them to be shifted or changed at pleasure from the broad gauge carriage bed to the narrow gauge carriage bed," or vice versa, thereby enabling the bodies of such carriages or waggons, when filled or loaded, to be transferred from a railway carriage of one gauge to that of another gauge without removing the passengers or unpacking the goods," the patentee stating that this will obviate the difficulty, delay, and inconvenience which must take place as railway carriages are at present constructed, where passengers and goods have to be transferred from one railroad to another of a different gauge.

The trucks or beds are furnished with grooves for the reception of flanged rollers or pulleys with which the bottoms of the carriage bodies are provided, the movement of one upon the other being thus facilitated, certain guide rails and stops to maintain the bodies in their places when mounted being also used, the guide rails entering grooves in the carriage bottoms, and such bottoms being double, so that the pulleys connected thereto may



not project into that portion of the carriage which receives the passengers or cargo. Underneath the truck are also drums or rollers round which ropes are coiled, these being passed through openings in the bed, around guide pulleys, and such drums or rollers being turned by winches when necessary and the carriage bodies moved by the ropes as requisite. Around the edges of the truck are also ledges projecting upwards, which when the carriage bodies are placed thereon effectually prevent them from being dislodged, parts of such ledges being, however, hinged to the truck, and thus capable of being turned downwards when it is necessary to remove such bodies. And in order to facilitate the removal of such bodies from one truck to another when such trucks happen to differ in height, the bearings of the trucks are provided with screws so arranged that by turning nuts upon them the height of the bodies of the trucks above the axles of their wheels may be varied.

The details of the invention are set forth at some length, the arrangements being mentioned as applicable to trucks and carriages for common roads as well as those for railways.

[Printed, 1s. 4d. Drawings. See Patent Journal, vol. 1, p. 1.]

A.D. 1845, November 20.—N° 10,966.

EDGE, ERNEST.—“Certain improvements applicable to the  
“wheels and axles of engines, tenders, carriages, and waggons to  
“be used upon railways.”

This invention is intended for adoption only in cases “where  
“the wheels are mounted upon revolving axles,” and is designed  
“to facilitate the transit of carriages over curves or other devia-  
“tions upon the line of railway. In ordinary locomotive engines,  
“tenders, carriages, or waggons used on railways, the wheels are  
“both ‘staked,’ keyed, or fastened upon their respective axles,  
“and consequently both wheels revolve with the axles whilst  
“running, and as is well known, in the event of passing over  
“curves in the line, their action is not uniform, but subject to  
“considerable friction and abrasion or ‘twist’ against one side  
“of the rails.” And this invention consists “in so constructing  
“wheels and axles that this imperfection may be obviated, and is  
“to be effected by ‘staking,’ keying, or fixing only one wheel  
“upon the revolving axis instead of both, and leaving the other

" wheel loose upon its axis, and at liberty to turn, slip, or even remain for a time quiescent when occasion may require."

[Printed, 4d. No Drawings. See London Journal (*Newton's*), vol. 29 (*conjoined series*), p. 343.]

A.D. 1845, December 10.—N<sup>o</sup> 10,990. (\* \*)

THOMSON, ROBERT WILLIAM. — "An improvement in carriage wheels, which is also applicable to other rolling bodies." Application of elastic bearings round the tires of the wheels of carriages for the purpose of lessening the power required to draw the carriages, rendering their motion easier and diminishing the noise they make when in motion. I prefer employing for the purpose a hollow belt composed of some air and water tight material, such as caoutchouc or gutta-percha, and inflating it with air, whereby the wheels will, in every part of their revolution, present a cushion of air to the ground, or rail, or track on which they run." The belt, when not subjected to pressure, is of less breadth than the tire, which is made much broader than usual; but that portion of the belt which is for the time in contact with the ground is extended laterally by the pressure to the same breadth as the tire, and the periphery of the wheel being thereby flattened at that part presents a more extensive surface to the ground. These wheels may be used with advantage on timber railways; in which case they are to be made without flanges, the carriages being kept on the rails by guide wheels acting against a central rail. To increase the bite of the driving wheels of the locomotive engine rivets with sharp conical heads are inserted in the outer cover of the elastic belt.

Similar elastic bearings may be applied to the surfaces of other rolling bodies.

[Printed, 1s. Drawing. See *Mechanics' Magazine*, vol. 40, p. 289; and *Patent Journal*, vol. 1, p. 61.]

A.D. 1845, December 10.—N<sup>o</sup> 10,998.

ALLIER, THOMAS VICTOR. — "Improvements on breaks or machinery for stopping or retarding carriages."

According to one mode of carrying out this invention a lever is provided, by means of which the engine driver may bring the retarding apparatus into action at pleasure, this lever being connected by means of a link with a chain, and a sliding bar, and other apparatus in combination therewith, and by which certain

other levers, having holes in them, are brought into contact with toothed wheels fixed on the axles of the carriage; these wheels then not only restraining the axles and bearing wheels from revolving, but being brought down into such a position that their lower ends, which are serrated, are forced into contact with the ground. The boss of the lever mentioned above is furnished with ratchet teeth, and a click acts upon these teeth when the apparatus is brought into operation, and retains the parts in the position into which they have been brought, until released therefrom by turning a winch which is connected with mechanism for removing the click from the ratchet teeth and otherwise restoring the parts into their first situations.

According to other modifications of the invention mechanism of somewhat similar character to that mentioned above is used in conjunction with apparatus by which "pressers" or breaks may be applied to the running wheels, certain projections on the axles of the carriages (for example) being made to act upon certain hooks, rings, and chains, and so not only press the break blocks against the wheels, but act upon certain springs by which the resistance to the progress of the carriage is increased. The details of the invention are very fully set forth.

[Printed, &c. Drawings.]

A.D. 1846, January 3.—N<sup>o</sup> 11,024.

SWINBURNE, THOMAS.—"Improvements in railways, and in "the means of propelling and carrying thereon."

One part of this invention consists in the construction of a carriage suitable for railways. The body of the carriage is composed of a hollow cylinder, having at each end a broad flanged rim, similar to that of the ordinary railway wheel. From each end of the cylinder a short axial arm projects, and by means of these arms a number of the cylinders may be united by connecting rods or shafts, so as to constitute a train of such cylinders, access being obtained to the interior of each cylinder by means of a "hinged door" in the periphery thereof. On a railway these cylinders travel upon the flanged rims mentioned above, but certain "caps" are provided, which being fitted on to the broad rims, and secured in their places by bolts and linch pins, the carriage is rendered useable on common roads. The patentee does not mention any mode of fitting up the interior of these cylinders.

The rest of the invention relates to atmospheric railways, and contains nothing which requires notice here.

[Printed, 10d. Drawing. See *Mechanic's Magazine*, vol. 46, p. 193; *Patent Journal*, vol. 1, p. 292.]

A.D. 1846, January 6.—N<sup>o</sup> 11,026.

**GREENHOW, CONRAD HAVERKAM.**—"Improvements in the  
" construction of railways and railway carriages."

According to one part of this invention the tyres of railway wheels are caused "to be so adjusted to the rails that under all  
" ordinary circumstances they will be adapted to each other," which is effected "by using a convex rail and a peculiar formation  
" of a concave wheel tyre, combined with inclined spokes, whereby  
" in the event of one rail sinking below the level of the other,  
" the tyre of the sunken wheel will bear upon the rail with an  
" increased diameter, so as to compensate in surface motion  
" for the depression, and form the peculiar concave shape. The  
" wheel and the rail will maintain a correct adjustment in respect  
" to each other," the patentee stating that "notwithstanding any  
" varying elevations and depressions of parts of the length of  
" rails, the wheels on the opposite rails will at all times be  
" running on such diameters as to make the distance moved  
" through by the common axle the same without any drag or  
" friction, corresponding with that heretofore consequent on the  
" flanges when moving against rails similarly circumstanced," and that "owing to this constant adjustment between the running  
" surfaces of the wheels and the rails, the rails may be laid with  
" the gauge so correct as not to allow of any play, for the adjust-  
" ment which takes place will prevent or tend to prevent any  
" rebound from rail to rail."

Different modifications of this part of the invention are described, and the invention also includes a mode of mounting the body of a railway carriage by suspending it upon necks or axes projecting from about the middle of each end thereof, the bearings of these necks or axes being fixed in uprights connected to a frame below the carriage, and this frame, again, resting upon springs carried by a lower frame mounted upon the axles. This arrangement prevents the body of the carriage from being inclined sideways in passing over a sunken rail, chains or straps, however, being provided for the purpose of preventing undue oscillation of the body.

Another part of the invention consists in applying to the bearings of the axles of railway carriages "a strong bar formed "into the arc of a circle," such bar sliding in bearings in the framing, and permitting the axles to assume varying positions when curves in the rails are being traversed, stops, however, being provided, which limit the varying motions of such axles.

[Printed, 1s. 4d. Drawings. See Repertory of Arts, vol. 8 (*enlarged series*), p. 73; Patent Journal, vol. 1, p. 146; Engineers' and Architects' Journal, vol. 9, p. 283.]

A.D. 1846, January 6.—N° 11,028.

BOZEK, JOSEPH ROMUALD. — "Improvements in the construction and application of railway carriage wheels."

In describing this invention the patentee mentions that it has been usual so to construct and apply these wheels that "the single flange on each wheel shall come on the inside of the rails of a railway," which construction and mode of application he has discovered to be objectionable, and that "very important benefits will be derived by constructing and applying railway wheels so that the single flange on each wheel shall come outside of the rail on which it is moving. For this reason in place of constructing the flange on the inner side, and then applying and keying the wheels on to their axes so that the flanges come on the inside," he causes the flange of each wheel "to be produced on the outer edge," and the wheels to be applied and keyed on to their axes "in such manner that the flanges will come on the outside of the rails of a railway."

[Printed, 4d. No Drawings. See Repertory of Arts, vol. 8 (*enlarged series*), p. 99; Patent Journal, vol. 1, p. 90; Engineers' and Architects' Journal, vol. 9, p. 246.]

A.D. 1846, January 20.—N° 11,048.

BROOMAN, RICHARD ARCHIBALD. — (*A communication.*) — "Certain improvements in railway and common road carriages."

[No Specification enrolled.]

A.D. 1846, January 31.—N° 11,068.

ETIENNE, ANDRÉ. — "Improvements in the construction of railways, railway carriages, and in the means of preventing accidents on railways."

According to one part of this invention the carriages or waggons are furnished with framework so constructed at the ends that the connection between one carriage or waggon and the next to it is formed by the use of pins or bolts acting as pivots, and which are varied in form so as to adapt them either to "single" or "compartment" waggons or carriages, being, moreover, furnished with springs, which permit the vehicles to be instantaneously separated. The principal object of this part of the invention appears to be the dispensing with buffers, and allowing a train of vehicles readily to pass round curves, the patentee including in this part of the invention, however, the use of wheels having two or more grooves in the tyre, the intention apparently being that should one groove lose its hold upon the rail, another may act thereon, or some of the flanges between the grooves sunk into the ground near the rail.

Another part of the invention consists in the use of a pilot waggon, which is meant to run in advance of a train, and to be maintained at a considerable distance in front thereof by a long bar composed of pieces of wood united by steel plates and springs, this bar being apparently meant to break in case of the pilot waggon meeting with any obstruction, and by so breaking set at liberty certain apparatus by which friction is applied to the wheels of the carriages or waggons of the train, and the latter thus stopped before it reaches the obstruction.

The details of these arrangements are described at some length, but in a somewhat confused and disjointed manner, this rendering the description by no means easy to understand, the details, moreover, including a large number of clips, bolts, bars, springs, and other mechanism, the arrangements of which will in no case be understood without the aid of the drawings annexed to the Specification, such arrangements embracing, among other matters, guiding wheels for preventing carriages from leaving the rails, and the use of shifting weights for preserving the equilibrium of such carriages, the latter being, according to one part of the invention, formed "to run on a way with one rail," the passengers being carried upon a floor supported by springs.

[Printed, 2s. 2d. Drawings. See Patent Journal, vol. 1, p. 214.]

A.D. 1846, February 3.—N° 11,071.

CHESSHIRE, EDWIN. — "Improvements in apparatus to be applied to railway carriages to reduce the prejudicial effects of collisions to passengers in railway carriages."

The main feature of this invention consists in applying, beneath the body of each of the passenger or other carriages of a train, "a strong rod or straight inflexible unyielding bar of iron or wood (or of iron and wood combined)," and which the patentee terms a "safety buffer," such rod being provided at each end with an "enlarged head," and being capable of sliding to and fro in sockets connected to the framework of the carriage.

This safety buffer is to be applied to each carriage of a train in addition to the ordinary buffers, but the rods of the safety buffers are so arranged in length that their heads only come into contact in case of the carriages being driven towards each other with such force as to compress the ordinary buffers to an unusual degree, in which case the heads of the safety buffers come together, and the rods of such buffers then form in effect one continuous and inflexible rod, extending beneath all the carriages of the train, a luggage van, however, being in all cases placed behind the last carriage, and such van having a safety buffer, which may be provided with springs, either the tender or a luggage van in front of the carriages being similarly provided. In order to keep these safety buffers in place during the ordinary working of the train, they are tied to the framing of the carriages by small cords, which, however, easily break in case of collision.

This invention is described at great and unnecessary length, the description embracing a multitude of details relating to matters well known, and not set forth as constituting any part of the invention itself. One idea of the patentee appears to be, that by coupling the van behind the carriages to the last of such carriages by a light chain, or other slender connection, the rebound of the van after a collision would break such connection, and so prevent the van from again striking the train.

[Printed, 1s. Drawing. See London Journal (*Newton's*), vol. 20 (*con-joined series*), p. 170; *Artisan*, vol. 6, p. 121; *Patent Journal*, vol. 1, p. 215; *Engineers' and Architects' Journal*, vol. 9, p. 285, and vol. 11, p. 124.]

A.D. 1846, February 27.—N° 11,114.

TEMPLETON, JOHN SAMUEL.—"Improvements in propelling carriages on railways, and improvements in propelling vessels."

One part of this invention consists in placing the flanges of the wheels of railway carriages in the middle of the tyre, or nearly so, instead of on one side thereof, so as to enable carriages furnished with such wheels to travel upon lines of different gauge, the inner



portion of the tyre being adapted to run upon a line of narrower gauge than the portion outside the flange.

Another part of the invention consists in grooving the tyres of the driving wheels of locomotive engines in such manner as to cause them to grasp or wedge themselves upon a peculiarly formed rail, this increasing the "efficiency" or tractive power of the engine. These wheels are not to be placed "in pairs on the same axles," the patentee preferring that two pairs of driving wheels shall be used, having their axes united by cranks and connecting rods, one of the wheels of each axle being of the kind mentioned, while the other is of the ordinary character, and the former being on opposite sides of the engine; this arrangement preventing damage to the rails in case of slight irregularities in the gauge, &c. Wheels may also be formed with the flange at or near the middle of the tyre, as mentioned, and the flange on one side of the tyre be grooved, and the other plain, the rails being so arranged that the engine will travel only on the plain parts of the tyre when on level parts of the line, the grooved portions coming into action when ascending inclines.

Another part of the invention consists in applying india-rubber or gutta percha to the running surfaces of the driving wheels of locomotive engines, in order to give such wheels a firmer hold of the rails. And the wheel may be so contrived that such india-rubber or gutta percha may only come into action in ascending inclines.

Another part of the invention consists in applying a drag or brake to a locomotive engine or carriage which is composed of two bars jointed together in the manner of a pair of pincers, the shorter ends of which are made to press when necessary against the opposite sides of a bar or rail laid down between the ordinary rails of the line, the bars being brought into action by means of a slotted plate connected to the rod of a piston mounted in a cylinder, and acted upon by compressed air supplied by a pump which is worked by an eccentric on one of the axles of the engine or carriage, and brought into operation through the medium of a clutch, suitable means being provided of regulating the force with which the apparatus shall act.

Another part of the invention consists in a mode of preventing railway carriages from running down inclines in case of becoming detached from a train which is ascending such incline. This is effected by the employment of a pointed bar which is connected

to a cylindrical box placed on one of the axles of the carriage, and provided with friction apparatus, by which the point is raised when the carriage is moving forward, and depressed when it moves backwards.

[Printed, 7s. 8d. Drawings.]

A.D. 1846, March 11.—N° 11,124.

NAIRNE, WILLIAM.—“ A new mode or new modes of propelling carriages along railways.”

This invention relates principally to matters which do not belong to the subject of this series of Abridgments. One part of the invention, however, consists in so arranging the bearing wheels of the carriages that they can revolve independently of each other. One wheel of each pair is made fast in the ordinary way upon one end of a solid malleable iron axle, while the other wheel is fastened upon one end of a pipe or tubular axle, into which the solid axle is inserted, the other end of the pipe or tubular axle coming against the nave of the wheel on the solid axle. The tubular axle is of cast iron, and is cast with a kind of broad internal rib at each end, being then bored out at the ends so that the solid axle may work freely therein. Thus when a carriage is passing round a curve, one wheel may revolve faster than the other in accordance therewith. The wheels are made perfectly cylindrical in those parts which work upon the rails, thus having greater hold thereon.

[Printed, 1s. 2d. Drawing. See Artizan, vol. 6, p. 15.]

A.D. 1846, March 11.—N° 11,134.

AUSTIN, HENRY, and QUICK, JOSEPH.—“ Improvements in the construction of railways, and railway carriages and conveyances.”

The carriages and conveyances employed in this invention are of “the narrow gauge dimensions,” and two pairs of wheels of similar diameter and substance are used or applied to each axle of such carriages or conveyances, two of such wheels being placed or fixed at each end of each axle, and at such distances asunder as to suit or fit the broad gauge, and the two inner wheels being arranged so as to suit or fit the narrow gauge, the axles being made of a proper and sufficient length for such purpose. The axle bearings may be situated between the wheels at either end, or

outside the outer wheels, as may be found most convenient, the grease or lubricating box being regulated according to the bearings. The patentee states that it will be possible to place or fix the wheels for the two guages on distinct axles instead of on the same axle as above described, but that this will require "separate bearings and springs on each axle, and separate provision to be made for lubricating the same."

[Printed, 4*l*. No Drawings. See London Journal (*Newton's*), vol. 28 (*continued series*), p. 265; Patent Journal, vol. 1, p. 276.]

A.D. 1846, March 25.—N<sup>o</sup> 11,151.

**TAYLER, JOSEPH NEEDHAM.**—"Certain improvements in propelling vessels, and also certain improvements in constructing vessels so as to be used in combination with certain machinery or apparatus for removing sand banks and other obstructions to navigation, part or parts of which machinery or apparatus may be used on railways, or may be adopted and applied to carriages on common roads."

One part of this invention relates to the construction of a truck or carriage which may be employed for railway or other purposes, the body of this truck or carriage being supported on two frames, one over the other, with an elastic bed between them to prevent or reduce vibration. This truck or carriage is also furnished with a means of stopping it in case of need, or while descending an inclined plane. A heavy iron tooth drag is attached to the carriage, and rendered self-acting on receiving a blow from in front by connecting therewith a centre buffer, applied to the carriage in addition to the two ordinary side buffers. And its operation would be as follows:—Supposing the tender or carriage in front of it to be suddenly stopped by meeting with any obstruction on the line, the pressure of the train behind (which with only the ordinary buffers would inevitably crush the carriage) would cause the ordinary buffers to be driven in the full extent of the action of their horizontal springs; the further pressure, however, would drive in the centre buffer, and release the heavy iron drag by pushing out a piece on the end of the centre buffer bar which supported it. The teeth of the drag would then be caused to dig deeply into the ground and retain the carriage from being crushed on to the tender. Such a carriage may be used as a "safety carriage," and may be placed either before or behind the carriages of a train, or one may be placed in front of and another

behind such carriages. And the action of the central buffer bar is also made to affect the disconnection of the truck or carriage from the carriage next behind it; either by causing it to act upon mechanism connected with certain levers, and so disengage them from hooks or rings in combination with which they formed the means of attachment between the two carriages; or by causing such buffer bar to release a certain chain which at other times holds up the weighted end of a lever, the consequent falling of the lever disengaging the "connector" between such carriages. These arrangements may also be brought into operation at pleasure by levers, screws, cams, and other mechanism which may be actuated by the guard, who may also, by means of certain chains, bring certain palls into contact with the teeth of ratchet wheels formed on the axes of the different carriages of the train, thus stopping the rotation of the wheels and bringing the train to a stand. An arrangement of carriage is also described in which small wheels are mounted in bearings beneath the body of such carriage so as to support the same in case of one of the other wheels or an axle breaking.

[Printed, 1s. 8d. Drawings.]

A.D. 1846, May 7.—N<sup>o</sup> 11,199.

**MELLING, THOMAS.**—"Certain improvements in steam engines, marine, stationary, and locomotive, and in machinery and apparatus connected therewith, parts of which are also applicable to regulating the flow of liquids generally."

One part of this invention consists of certain improved modes of constructing railway wheels for locomotive engines, tenders, passenger carriages, luggage waggons, &c. The body of the wheel " (that is the nave, arms, and inner ring) is made in segments, two, three, or more," as found convenient; "these segments are connected by feathers and grooves with each other, and each is made with a groove on its periphery (coinciding in position with the grooves of all the other segments), which receives a corresponding fillet rolled on the under side of the tyre, and the hole in the nave for the reception of the axle is bored of larger diameter than the axle, in order to leave room for the insertion around it, from the outside, of a hollow expanding piece, which is interiorly of the same size and form as the axle, and fits easily upon it, and is exteriorly of the form of

" a cone, so that in proportion as this expanding piece is forced  
 " in the segments of the wheel are expanded, the tyre tightened,  
 " and the axle more firmly gripped." Thus tyres can be taken off  
 and put on wheels without being heated, and consequently with  
 very little delay or expense, and it will be necessary to keep only  
 duplicate tyres, instead of duplicate wheels and axles, as is now  
 the practice; and as the tyres are put on cold " they can be case  
 " hardened, and all the advantage of steel tyres be thereby  
 " obtained at far less cost," other advantages being mentioned as  
 arising from this system. The patentee terms a wheel thus  
 formed an " expanding wheel," and describes various modes of  
 carrying out this part of the invention, which includes a mode of  
 forming the tyre by the use of several bars formed into rings,  
 placed side by side, and held together by flanches on each side the  
 rim, which bars may, however, be united by welding if preferred;  
 another mode of forming tyres, as also axles and other articles,  
 consisting in welding together a number of such bars. A mode  
 of turning the tyres of railway wheels is also described, in which  
 the tyre is placed upon a " conical expanding block or blocks,"  
 and operated upon by cutters carried by a " hollow cutting head "  
 and by " side cutters," actuated by " stars " or screws, these  
 parts being used in combination with suitable gearing and appa-  
 ratus, by which their action is governed.

[Printed, 5s. 8d. Drawings. See *Mechanics' Magazine*, vol. 43, pp. 505 and  
 574, vol. 46, p. 1, and vol. 48, p. 97; *Practical Mechanics' Journal*, vol. 2,  
 p. 222; *Patent Journal*, vol. 1, p. 423.]

A.D. 1846, May 22.—N° 11,216.

GREAVES, HUGH.—" Improvements in the construction of  
 " railways, and in the carriages to be used thereon."

One part of this invention relates to the construction of an im-  
 proved railway carriage wheel, and consists " in the nave and  
 " felloes being of malleable cast iron, and the spokes being of  
 " wood, the tyre of such wheel being contracted round the felloe  
 " in the usual manner."

The invention further consists " in an improved construction  
 " of the journals of an axle, which consists in folding round the  
 " axle and welding on it a plate or bar of iron, the fibres of  
 " which plate lie at an angle to the fibres composing the inner  
 " part of the axle, in order to procure and retain a smoother  
 " working surface."

Also, "in placing the body of a carriage upon the frame which supports it, so that they shall be united at the neutral axis only of each frame." Carriages having long bodies may be placed upon separate frames, and united at the neutral axis only of each frame.

Also, in a mode of attaching carriage frames together "by draw bars, which screw into each other between the frames of two carriages, and are connected by a pin fixed at the neutral axis of each carriage frame, and thereby form one continuous rigid draw bar."

Also, "in interposing springs between the parts where the carriage and frame are attached, so as to aid the buffer in resisting a shock."

Also, "in an improved mode of uniting and acting upon the breaks of a train, so that they all may be simultaneously brought into action from the first, the last, or from any intermediate carriage," this consisting in the employment of rotary shafts, with which the carriages are provided, and which being put in motion by means of suitable gearing and a handle, cause worms upon them to operate through the medium of toothed segments and other apparatus upon the breaks, the shaft of one carriage being connected with that of another through the medium of cylinders, having pieces of metal at the ends through square holes in which the squared ends of the shafts are passed.

[Printed, 3s. 6d. Drawings. See Patent Journal, vol. 2, p. 525; Practical Mechanics' Journal, vol. 4, p. 84; Artizan, vol. 9, p. 147.]

A.D. 1846, June 2.—No 11,234.

STUBBS, WILLIAM, and GRYLLS, JOHN ISAIAH.—"Improvements in locomotive and other engines and carriages."

One part of this invention consists in mounting railway carriages upon eight wheels, the object of this arrangement being "to obtain greater stability and steadiness."

And another part of the invention consists in mounting carriages upon three pairs of wheels, the central pair being much larger than the others, and the axle thereof passing through the upper part of the body of the carriage, the object of this part of the invention being "also to obtain stability and steadiness to carriages." The other parts of the invention do not require notice here.

[Printed, 4s. Drawings. See Repertory of Arts, vol. 9 (*enlarged series*), p. 321; Patent Journal, vol. 2, p. 474; Practical Mechanics' Journal, vol. 4, p. 22.]



A.D. 1846, June 4.—N° 11,237.

ROBERTSON, JOSEPH CLINTON.—(*A communication.*)—"Certain improvements in railways and railway carriages."

These improvements consist in a certain arrangement by which the probability of accidents from the breaking of the axles of the wheels of the carriages, or from the carriages running off the line, is greatly diminished. In the centre of each line of railway a centre rail is placed, which is much more elevated than the two side rails, and the bottom of each of the carriages is furnished with one, two, or more triple sets of rollers, one of which is placed horizontally, so as to come in contact with and run on the top of the centre rail in the event of an axle breaking, while the two other rollers are placed vertically, one on each side of the centre rail, to prevent the carriage from swerving to either side.

These rollers "run always free of the centre rail, except when any accident occurs, or the making of a sharp curve brings them into action," and the number of sets attached to each carriage "varies with the length of such carriage."

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 46, p. 483; *Patent Journal*, vol. 2, p. 490.]

A.D. 1846, June 29.—N° 11,274.

PARKIN, THOMAS.—"Improvements in the means of giving motion to locomotive carriages, with or without bearing wheels attached to them, and in the construction of ways, passages, and roads on which the said carriages are to travel."

According to one part of this invention, the bodies of carriages are mounted upon platforms so contrived as to travel upon "parallel lines of friction wheels," which are placed upon axes revolving in chairs suitably arranged on each side of a line of railway. These platforms may be connected together through the medium of universal joints, or they may be united by means of ribs projecting from one, between which arms connected with the next may enter, this last-mentioned arrangement causing a number of platforms to constitute "one entire platform without any joints whatever." And in order to prevent the platforms from leaving the friction wheels the former are provided with flanges on their lower sides, and are made "wider than the gauge of the friction wheels," this part of the arrangement allowing "play" between the flanges and the wheels, "in order the better to pass curves."



The carriages in this invention are propelled by ropes or chains passing round drums turned by suitable motive engines, and one part of the invention consists in furnishing the carriages with catches or hooks, so arranged that in case of the traction rope or chain breaking while dragging them up an incline, such catches or hooks will come into contact with ropes or chains placed across the line, and so prevent the carriages from running backwards down such incline.

The "friction wheels" are composed of brass bushes, wooden sectors, and iron rings or plates, the sectors being between the latter and the bushes; and a mode of stopping a train is described, in which a "gripe" composed of two arms provided with friction pulleys is furnished with right and left-hand screws, by turning which the friction pulleys are pressed against the sides of the drums, by which the train is moved. The "friction wheels" are not placed in pairs, or opposite to each other, but so that each wheel on one side of the line of way is opposite the middle of the space between two of the wheels on the other side, and thus "any three wheels shall always form a triangular support to the platform" of a carriage.

[Printed, 1s. 2d. Drawing. See Patent Journal, vol. 2, p. 538.]

A.D. 1846, July 14.—N° 11,296.

**BROWN, SAMUEL.**—"Improvements in railways and carriages to run on railways, and in the constructing and arming ships or vessels."

According to one part of this invention the bodies of railway carriages are mounted upon wheels, the axles of which are so placed that "two-thirds of the whole load is suspended below the centre of gravity," this rendering such carriages less liable to overturn or leave the rails. The wheels are of large diameter, and besides the bearing wheels the carriage is also furnished with large guiding wheels, deeply grooved, and travelling over a central rail, the grooves of such wheels being "bell-mouthed," and this enabling them to retain their hold on the central rail, even if the carriage should be jolted upwards to a considerable extent. Carriages thus mounted may travel upon either wooden or iron rails.

Arrangements are also described in which horizontal guide wheels are placed below the carriage, and run on each side of a

central guide rail. And the invention includes a method of adapting the wheels of carriages to rails of different gauges, the wheels being mounted upon separate short axes, which may be placed nearer together or farther asunder by means of a screw and certain gearing, brought into action when necessary by means of a clutch.

[Printed, 1s. 4d. Drawings.]

A.D. 1846, July 27.—N<sup>o</sup> 11,314.

HEATH, ROBERT. — "Certain improvements in wheels to be  
" used upon certain rail and other roads, which improvements  
" are also applicable to mill gearing and other similar pur-  
" poses."

This invention consists in a peculiar formation of wheels "in  
" connection with the particular relative proportions of the  
" different parts of the same, whereby the contraction consequent  
" upon the cooling of the metal in casting is caused (instead of  
" weakening the wheel) to bind the whole together into one solid  
" mass." The arms may be either flat, round, or of any other  
shape, "but of the same sectional thickness at the rim as at the  
" boss, and without any flanges or ribs, so that the arms shall  
" not contract more or sooner at one place than another," the  
wheels being formed, by preference, "with an uneven number of  
" arms, so as to assist the contraction of the rim, that is, having  
" each arm opposite to the space between the two opposing  
" arms," and the rim and the boss being each "three times the  
" strength of the arms, or thereabouts."

The patentee states that in making the driving wheels of loco-  
motive engines he casts "a ring of metal about half way between  
" the outer rim and the centre of the same, to prevent the thrust  
" of the crank from breaking the arms."

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 31 (*conjoined series*), p. 354.]

A.D. 1846, July 30.—N<sup>o</sup> 11,318.

MALLET, ROBERT, and DAWSON, JOHN SOMERS.—(*Partly a communication.*)—"Certain improvements in railway carriages,  
" and in machinery for working railways, parts of which are  
" applicable to other carriages and the bearing of other  
" machinery."

One part of this invention consists in an improved method of connecting the axle boxes and bearings of the axles of railway carriages with the framing of the under carriages, so as to give freedom of oscillation, within certain limits, to the wheels, axles, and axle bearings without such oscillation being transferred to the body of the carriage itself, whereby much of the jolting, the axle friction, the wear and tear of the flanges and tyres of the wheels, the expenditure for lubrication and for maintenance of way, will be all much diminished. This is effected "by hanging the under frame of the carriage at the lower extremities of peculiarly formed axle guards, by two links or bars, the upper ends of which are connected with the axle box at its upper part, and which links are free to oscillate within certain limits round their lower extremities (or eyes), as centres in a plane transverse to the line of motion of the carriage."

Another part of the invention consists in the employment, for the purpose of lubricating the journals of the axles of locomotive engines and railway carriages, and all other sorts of revolving and rubbing cylindrical surfaces, "of a vessel of oil or other fluid unguent, having floating on the surface thereof a ball or sphere or balls or spheres, or other suitably shaped body or bodies," for the purpose of applying the said unguents.

Another part of the invention consists in using for the journals of locomotive and other revolving axles and shafts compound bearings, "formed partly of agate or flint, or other natural stone or mineral, or of glass, porcelain, stoneware, or other like artificial composition, and partly of metal or metals."

And another part of the invention consists in forming at the edge of the tyre of the wheels of railway carriages a projecting ring or fillet, which is surrounded by a hoop, the extremities of which are provided with a right and left-hand screw and other apparatus by which they may be brought closer together, so that the fillet shall be grasped by the hoop, and the wheels thus held fast and prevented from revolving, this arrangement thus serving the purpose of a break.

The other parts of the invention do not require notice here.

[Printed, 2s. 2d. Drawings. See Repertory of Arts, vol. 17 (*enlarged series*), p. 1; Mechanics' Magazine, vol. 46, p. 145, and vol. 47, p. 180; Practical Mechanics' Journal, vol. 2, p. 213.]

A.D. 1846, August 26.—N<sup>o</sup> 11,352.

BESSEMER, HENRY. — "Certain improvements in railway engines and carriages, parts of which improvements are applicable to the propulsion of steam vessels, and to motive purposes generally."

This invention consists, firstly, "in enclosing or filling up the spaces now left vacant between the various carriages of railway trains," whereby "one continuous unbroken line of surface" is obtained for the purpose of lessening the atmospheric resistance to the transit of such trains.

Secondly, in "enclosing or covering in the under part of the framing of railway carriages, in order to diminish the resistance of the atmosphere to the progress of such carriages."

Thirdly, in constructing the front carriages of railway trains "of a pointed or wedge form, for the purpose of facilitating their passage through the atmosphere." Also in constructing the axles of locomotive engines and carriages in two parts, coupled together, the coupling being cast or bolted upon them; in the employment of "rings or journals, formed on that part of the axles of locomotive engines and carriages which revolves within the axle box;" and in making railway wheels "with an outer flange on the periphery thereof."

The object of the rings or journals is to prevent any "looseness endways" of the axle, and the wear and tear which would arise therefrom; and the "outer flange" with which the patentee furnishes railway wheels is meant to prevent the ordinary flange "from rubbing against the inner side of the rail." The arrangement of axles allows the wheels to revolve independently of each other. The invention embraces a number of other particulars, none of which, however, require notice here.

[Printed, 1s. 4d. Drawings. See *Mechanics' Magazine*, vol. 48, p. 507; *Patent Journal*, vol. 2, p. 755.]

A.D. 1846, August 30.—N<sup>o</sup> 11,361.

HENSON, HENRY.—"Certain improvements in railways and railway carriages, having for their object the better accommodation and security of the public."

One part of this invention relates to means of transferring carriages and trucks from one line of rails to another of different

gauge, and consists essentially in the use of trucks formed so as to run upon rails of one gauge, and to receive upon them trucks or carriages formed for running upon rails of a different gauge, and to convey them along those rails to which they are not adapted, the two gauges of rails being placed at different levels so as to facilitate the transfer of trucks or carriages thereto from the trucks first mentioned, and which themselves carry rails, the trucks or carriages which are supported by them being secured thereon by catches and certain apparatus connected therewith.

Another part of the invention relates to the construction of the bodies of railway carriages, and consists essentially in forming the framework of iron, the basis of each partition being composed of an iron hoop bound together by cross stays, "one of which connects the roof and bottom," the whole being covered with iron plate, which, according to one arrangement, is riveted thereto, there being under the heads of the rivets a layer of felt. The seats of the carriage are placed "in single rows, or in a serial coupé manner, and with feet warmers and elastic head and body protectors placed in front of the seats," all of which are fully described.

The invention further includes the constructing of goods carriages "with double pannellings of iron, or iron and wood, and sliding roofs, whereby the same are rendered fire and waterproof and may be as readily loaded and unloaded from the top as open waggons." Also the employment of sliding roofs in goods carriages of whatsoever construction; the formation of cattle waggons with doorways in each side, and stalls so arranged that the cattle may be led into the waggons with facility and removed from them without "backing."

Also an improved construction of "draw bar" so contrived that upon an engine or a carriage provided therewith leaving the rails the connection of such engine or carriage with the rest of the train will be severed.

Also a mode of constructing axles in which an internal bar with thickened ends forms the central portion of the axle, this being surrounded by a tubular portion, united thereto at the ends, but the space between the tubular portion and the smaller part of the internal bar being filled with wood, or with oil, tar, or some other substance, in order not only to strengthen the axle but to lessen vibration therein.

Also a mode of constructing axle boxes in which three moveable plates serve the purpose of the ordinary "brasses," the "angular spaces" between the plates being filled with sponge saturated with oil for lubricating the axle, and the plates being easily removed and replaced when worn or damaged.

[Printed, 2s. 4d. Drawings. See *Mechanics' Magazine*, vol. 46, pp. 241 and 350.]

A.D. 1846, October 6.—N° 11,396.

**HOLDSWORTH, SAMUEL.**—"Certain improvements in apparatus to be applied to railway carriages to prevent accidents thereon."

This invention relates to the construction of buffers, these, according to this invention, being constructed by "fixing inside the carriage framing and under the flooring a series of metal tubes, in which suitable pistons are to be fitted with piston rods which project out at one end of the tubes and terminate in the cushions;" the patentee stating that the "elastic force required may be obtained in various modes."

The tubes may vary in number, but the patentee states that he prefers to apply four of them on each side of the carriage frame, each four having their piston rods joined to one buffer head, or cushion. The tubes may be filled behind the pistons with compressed air, to serve as an elastic medium of resistance to the buffers, or spiral springs may be used instead of compressed air, or the two may be employed in combination, in which case, should any accident occur to the "air apparatus" the spring will yet be available for use.

A mode of filling the tubes with compressed air, by means of an air pump, is mentioned, but the details of the invention may be varied according to circumstances.

[Printed, 10d. Drawing. See *Patent Journal*, vol. 2, pp. 762 and 793.]

A. D. 1846, November 3.—N° 11,433.

**EDDY, GEORGE W.**—"An improvement in the manufacture of cast metal wheels for railway and various other carriages."

This invention consists in a new and improved mode of constructing or forming a cast metal wheel (for railway cars or other purposes) by which the said wheel may be founded or

"cast with a cold chilled tread or rim, and with little or no danger of breaking or cracking, or being liable to afterwards break or crack, by reason of strains such as usually generated within it while being made or founded according to any of the forms or modes heretofore usually adopted in the manufacture of such wheels." The wheel is composed of a cast metal rim and hub, united together by two cast metal plates, "the union of the same being effected by casting or founding the whole in one piece at one and the same time, and in a mould prepared with or having an iron or metal chill or ring properly adapted to it, so as to suddenly cold chill or harden the periphery or tread of the wheel during the operation of casting or founding it."

One of the plates thus used is of "undulating" form, the other being concave or convex; but two undulating plates may be used, the patentee stating that such plates will readily yield to the contraction of the rim, and that he claims the use of such plates even when combined with a rim and a hub which may be separated or divided transversely into two parts, the separation taking place between the two plates.

[Printed, Ed. Drawing. See Repertory of Arts, vol. 9 (*enlarged series*), p. 333; London Journal (*Newton's*), vol. 31 (*conjoined series*), p. 35; Artisan, vol. 9, p. 143; Patent Journal, vol. 2, p. 834; Engineers' and Architects' Journal, vol. 14, p. 411.]

A.D. 1846, November 3.—N° 11,435.

EXALL, WILLIAM.—"Improvements in the construction of wheels, and in certain implements or tools employed therein, and in the mode of forming and manufacturing the tyre of wheels, which mode is applicable to making metallic rings, bands, hoops, cylinders, and other similar articles."

One part of this invention consists in a mode of forming cast metal naves for wheels. Each nave is cast in two parts, the boss or part which receives the spokes constituting the outer part, which is held upon the axle by being connected to a back plate, within which works a collar formed on the axle. The apertures in that part which receives the spokes are wedge-shaped, the ends of the spokes being of corresponding form and the outer part of the nave has a central box or hollow neck projecting from it, within which the end of the axle works, this projecting portion forming an oil box.



Another part of the invention is applicable to the formation of the tyres of railway wheels. A coil of thin metal is first formed by winding (for example) a length of iron hoop, coil by coil, one close over the other, and then securing the ends from uncoiling and subjecting the whole to a welding heat, the coils being then welded or united by hammering if desirable. The ring thus formed is then placed in a heated state between rolls, having upon them such flanges, grooves, or mouldings as may be necessary to bring the whole into the form of tyre required. Previous to this rolling operation the ring is of less diameter than the proposed tyre, and is increased in diameter during the rolling process, and before this process is completed certain guide rollers are introduced within the ring, these being mounted in bearings carried by screws, and radiating from a central axis, certain bevil wheels being so arranged that the screws may be turned simultaneously and so press the rollers against the interior of the tyre. "In this manner tyres for wheels for railway and other carriages may be finished sufficiently true at once."

The other parts of the invention, which embrace the manufacture of wooden wheels suitable for common road carriages, with iron tyres for such wheels, and also bands or cylinders for boilers, flexible endless bands for driving machinery, endless band saws, and other articles, do not require notice here.

[Printed, 1s. 2d. Drawings. See Patent Journal, vol. 2, p. 841.]

A.D. 1846, November 5.—N° 11,442.

MABERLY, FREDERICK HERBERT, BRANWHITE, THOMAS, and LUSHER, DENNIS.—"Improvements in machinery for obtaining and applying, and for accelerating and for retarding, motive power, and for giving notice of alarm in expectation of or in actual danger."

This invention consists, firstly, in a particular form of wheel, such wheel "avoiding resistance of the air," and the construction thereof "preventing the tyre being thrown off whatever the velocity with which the wheel should be driven."

The tyre is formed with an internal as well as external flange, and bolts passing through the former secure the tyre to the wheel, the latter not being formed with spokes, but having its inner part composed of plates, which may be either of wood or of metal.

Another part of the invention consists in certain modes of arranging breaks so as to cause them to be readily pressed upon

the rails at pleasure. In some cases these breaks are actuated through the medium of levers and connecting rods; in others, by means of a rod carrying "irregular pieces" which act as cams; in others by inclined planes; and in some cases such breaks are so arranged as to act as "shoe breaks," and when brought into operation to raise the wheels of the carriage off the rails. Other breaks, applicable to the wheels of carriages, are also described, as likewise various modes of bringing them into action through the medium of wedges, springs, bars, chains, and other suitable apparatus, one arrangement being set forth in which break rods, connected by means of universal joints, and made in parts which are capable of sliding one within another, not only ensure the breaks of all the carriages of a train coming into action simultaneously, but also serve as buffers. These arrangements, however, will only be fully understood with the aid of the Drawings annexed to the Specification.

[Printed, 1s. 4d. Drawings. See Patent Journal, vol. 2, p. 24.]

A.D. 1846, November 12.—N° 11,445.

ADAMS, WILLIAM BRIDGES.—"Certain improvements in the  
" construction of wheel carriages and engines moved or retarded  
" by animal or mechanical agency, parts of which improvements  
" are applicable to other like purposes."

One part of this invention relates to laminated or plated springs for carriages, and includes an arrangement in which the several plates are formed with a bend about the mid-length, where the fastening clips are applied, leaving the rest of the plate straight. Two springs of this kind may be combined. Plates of steel thickest in the middle are also used for such springs, and convex on one side and concave on the other, this arrangement dispensing with slots and studs for keeping them together, and bow springs are described as being formed of two plates, instead of one, as usual. Disc springs are described as being concave, and having a hole in the centre and radial slots, being then passed upon a rod in any suitable numbers, and used not only as bearing but also as buffer springs, and, if desired, in combination with a piston working in an air cylinder, being also applicable as traction springs.

Another part of the invention consists in forming the traction and buffer rods of railway carriages of welded iron tubes, so as to

render them lighter than usual; and another part of the invention consists in giving elasticity to wheels by placing wooden spokes with the "greatest breadth of the wood" in the direction from front to back of the wheel.

The invention further includes placing a piece of wood, metal, or leather in contact with the ends of axles, to form "endway" bearings for such axles; also, a mode of permitting endway or transverse motion of an axle box within an opening through an upright guide rod, this being instead of the ordinary axle guide; also extending the bearing of the axle box over the greater part of the length of the axle, and increasing the number of bearing springs accordingly; also, the application of corrugated instead of plain sheet metal for the panels of carriages; also, a mode of applying a flanged rail brake, so arranged as if necessary to raise the wheels of a carriage off the rails; also, uniting two or more carriages so as to act in travelling as one carriage, and permit internal communication between them; also, coupling carriages together by joints which allow of lateral but not vertical flexure, springs regulating such flexure; also, certain modes of arranging the wheels of such united carriages and other parts in connection therewith as to facilitate the traversing of curves; also, in placing the boiler of a locomotive engine between the axles of the wheels, the frame being below the axle boxes, and having a body for passengers as well as for a supply of fuel and water; also causing the pistons of the engine to act upon the wheel or wheels on one side of the engine independently of those on the other; and a mode of applying disc springs to or within the cushions of seats so as to render the latter more easy. All these particulars are set forth at great length and under various modifications.

[Printed, 2s. Drawings. See Practical Mechanics' Journal, vol. 1, p. 193; and Patent Journal, vol. 2, p. 882.]

A.D. 1846, December 1.—N<sup>o</sup> 11,463.

BRIDGES, HENRY.—"Certain improvements in railway wheels."

[No Specification enrolled.]

A.D. 1846, December 2.—N<sup>o</sup> 11,472.

JOHNSON, WILLIAM.—"Certain improvements in propelling "carriages on railways."

One part of this invention consists in a mode of constructing the framing or under carriage of locomotive engines in two parts,

and connecting them together by swivels or vertical pin joints, whereby such engines are enabled to travel round sharp curves at high speeds without danger.

Another part of the invention consists in mounting the bodies of passenger carriages upon platforms, which by means of pins or pivots are connected to a short frame which constitutes the junction between one carriage and another, the latter being supported on six wheels, two of which are larger than the others, and placed upon an axle which works between two carriage bodies, and the whole arrangement being such as to cause a train of such carriages easily to accommodate itself not only to curves but also to undulations in the line of rails.

[Printed, 1s. Drawings.]

A.D. 1847, January 16.—N° 11,533.

GRAFTON, HENRY.—“Improvements in railway wheels, and “apparatus connected with railway carriages.”

One part of this invention consists in so constructing railway wheels that they have each two tyres and two flanges placed at some distance apart on the felloe of the wheel, thus enabling such wheels to travel upon different gauges indifferently.

Another part of the invention consists in a mode of applying breaks to such wheels. The break is composed of an elastic band which embraces the wheel, and is drawn tight when necessary by means of a lever to which it is jointed, and a connecting rod and second lever furnished with a handle.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 10 (*enlarged series*), p. 86; Patent Journal, vol. 3, p. 186; Engineers and Architects' Journal, vol. 10, p. 248.]

A.D. 1847, January 28.—N° 11,546.

BRAITHWAITE, JOHN.—“Certain improvements in heating, “lighting, and ventilating.”

According to one part of this invention a gas lamp of one burner is described, in which the burner is composed of three concentric tubes, which are respectively appropriated to the passage of air, gas, and smoke, this burner being furnished with a chimney and shade, and the whole being sustained by two tubes, one of these serving to supply the burner with gas, and the other communicating with a receiver or collector into which

the smoke and noxious exhalations from the burner enter, and are conveyed by the tube back to the burner, where they are consumed. These arrangements may be variously modified, and applied not only in causing a lamp to consume its own smoke and vapour, but also in the lighting, warming, and ventilation of rooms and buildings and other structures, including railway carriages, pipes being in some cases so arranged as to carry off heated and vitiated air into the atmosphere outside the apparatus. And the invention includes the construction of a "thermostatic lever," composed of two strips of different kinds of metal, and possessing different degrees of expansibility, and which is applicable to the throttle valves or dampers of heating and ventilating apparatus generally, such lever being suitably connected with the valve or damper, and placed in such a position that the varying degrees of heat to which it is subjected cause variations in the form of the lever, and so regulate the opening or closing of the damper or valve.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, p. 217, vol. 47.]

A.D. 1847, February 24.—N<sup>o</sup> 11,594.

LOWE, JOHN, and SIMPSON, JAMES.—"Certain improvements applicable to carriages to be used upon railways, part of which improvements may also be used upon other roads."

This invention consists, "first, in a certain novel method of causing the momentum of a train of railway carriages to apply friction to either or both the axles or wheels of each of the carriages in the said train simultaneously, or nearly so, the instant the speed of the engine is slackened (or when the break is applied to the tender) so as to retard or stop the progression of the carriages, the friction or breaks being removed the instant the engine starts." Each axle of each carriage is provided with a friction cylinder, upon which a break is made to act through the medium of a slotted break bar and a sliding rod extending the whole length of the carriage, and furnished with a hook and shackle at each end, these hooks and shackles forming the connection between one carriage and another, and such rod being furnished with springs and a catch piece through the medium of which it acts upon the breaks when the speed of the engine and tender slackens.

Another part of the invention relates to a mode of constructing coupling links, in which the latter are furnished with fixed nuts

and sliding blocks, screws passing through the nuts forcing such blocks, when desired, against the hooks of the carriages, which are inserted within the links.

Another part of the invention relates to shackles, and consists in furnishing such shackles with ratchet teeth, a block mounted thereon having corresponding teeth therein, this block serving to prevent the carriage "becoming unhooked," but being connected with an arrangement of springs and pins which admit of its being moved when needful.

Another part of the invention relates to the springs of carriages, such springs being suspended between "scroll irons" by means of links connected to rods "which vibrate upon a pin fixed in the "axle box." Different modifications of this part of the invention are described.

[Printed, 1s. 2d. Drawings. See London Journal (*Newton's*), vol. 31 (*conjoined series*), p. 419; Patent Journal, vol. 3, p. 331.]

A.D. 1847, March 10.—N<sup>o</sup> 11,618.

WATERHOUSE, THOMAS. — "Certain mechanical improvements applicable to railway engines and tenders, and to railway carriages of various kinds."

This invention consists, firstly, in giving "a revolving action to one wheel on each axle of a railway engine or tender; or of railway carriages of various kinds, wholly independent of the action of the opposite wheel on the same axle;" in one case without interfering with the rotation of the axle itself, and in the other case by dividing the axle into two parts, "so that in either case the said first-mentioned wheel may travel at any speed faster or slower than its opposite wheel, suited to the curved line of rails which it may have to pass over or along, or to other circumstances rendering such variation of speed between two opposite wheels desirable." This part of the invention consists in reality in forming the axle of two parts, one being solid, and the other hollow, the former passing through the latter, and one wheel being placed upon each.

The rest of the invention relates to a mode of giving signals, but this part of the invention will be noticed in another series of Abridgments.

[Printed, 1s. Drawing. See London Journal (*Newton's*), vol. 30 (*conjoined series*), p. 420; Patent Journal, vol. 3, p. 431; Engineers' and Architects' Journal, vol. 16, p. 247.]



A.D. 1847, March 15.—N° 11,621.

LLOYD, SAMPSON. — "Improvements in the manufacture of  
" tyres or hoops for wheels and other articles to be made of iron  
" or steel."

This invention consists in removing from tyres and hoops for wheels and other articles, while the latter are in a heated state, by means of a revolving cutter or revolving cutters, "the asperities or uneven surfaces caused by the previous treatment to which the iron or steel is subjected in bending or forming it into the required general shape, or which may exist upon such articles from any other cause, whereby to a considerable extent, or entirely so, the necessity of turning tyres or hoops of iron or steel in a lathe (when cold) is dispensed with, and much time and labour saved."

The mode of carrying out the invention may be varied, but an arrangement is described as being suitable for operating upon the tyre of a railway wheel, in which the tyre is placed in a heated state upon "annular segments," the whole resting upon a horizontal bed plate mounted at the upper end of the cylinder of a hydrostatic press, the ram of which is of conical form at the upper part, this part passing within the annular segments and being driven upwards by the pressure of the water in the cylinder, so as to cause the segments to expand the tyre "into the required circular form," whilst it is acted upon by a rapidly rotating circular cutter, the cylinder of the press, with the tyre, being caused to rotate slowly during the operation, and being, moreover, caused to ascend or descend as may be required by means of a lever which is moved by a screw. The details of this mechanism are minutely set forth, but the patentee does not confine himself thereto, and the invention may be applied to axle guards and buffer rods, as well as tyres and other articles.

[Printed, 10d. Drawing. See Patent Journal, vol. 3, p. 426.]

A.D. 1847, March 23.—N° 11,631.

FOX, CHARLES.—(*A communication.*)—"Improvements in the  
" permanent way of railways, and in carriages to be employed on  
" railways."

One part of this invention consists in a mode of constructing a carriage wheel, "in which the flange is placed round the middle



“ or nearly the middle of its tire, instead of its being placed at one side or edge of the tire, as at present, by which a tread or bearing surface on each side of the flange is obtained,” and the wheel being thus adapted for travelling upon lines of rails which are made double, the flange running between the double rails.

Another part of the invention relates to the axle boxes of railway carriages. Each axle box is made of brass, or such other metal as will produce slight friction upon the journal of the axle, and the interior surface is compressed or hardened; and in order to allow the axle guard to move up and down at each side of the axle box, the latter is furnished with pivot boxes furnished with pieces of wood between which the axle guard works.

Another part of the invention consists in dovetailing or inlaying pieces of hard steel or other hard metal into the face or tread of each of the driving wheels of a locomotive engine, “so as to increase the hold or bite of the wheels upon the rails.”

[Printed, 1s. 2d. Drawing.]

A.D. 1847, March 29.—N° 11,642.

GRIESBACH, JOHN HENRY.—“Improvements in the construction of railways, and in engines and carriages to run thereon.”

This invention consists, in the first place, of “a mode of arranging guide rails to the ordinary rails of a railway, and combining therewith certain horizontal wheels” in such manner that railway carriages may run with more safety than usual, and yet be able to pass with freedom from one pair of rails to another without requiring flanges on the wheels. Various modifications of this part of the invention are described, additional or guide rails being combined in various ways with switches, turntables, and other apparatus.

Another part of the invention consists in mounting the wheels of railway carriages loose upon the necks of their axles, the outer ends of the axles being square, and fitting into boxes of corresponding form, such wheels being retained in their places on the axle by certain collars and screw nuts, and a groove being formed in the axle, which constitutes a communication between the axle and a box filled with material by which the axle is lubricated.

[Printed, 1s. 4d. Drawings. See Repertory of Arts, vol. 10 (*enlarged series*), p. 57; Patent Journal, vol. 3, p. 457.]

A.D. 1847, April 6.—N° 11,648.

STRATTON, BENJAMIN TUCKER.—“Improvements in railways  
“ and in wheels and other parts of carriages for railways and  
“ common roads, partly applicable in the construction of ships or  
“ other vessels, and improvements in machinery for manufactur-  
“ ing certain parts of the same.”

One part of this invention consists in constructing wheels for railway carriages “with spokes formed as sectoral loops of corrugated or hollow iron, of any form in its section, or of flat or round or oval rods of iron, or of angle or T iron, with a straight radiating spoke inserted between and in contact with the straight sides of each contiguous pair of looped spokes.”

Another part of the invention consists in casting the naves of wheels for railway carriages “round blocks of pumice stone, or other suitable material, inserted between the ends of the spokes in the mould previous to casting.”

Another part of the invention relates to the construction of the bodies of railway carriages, and consists in forming the ribs or standards of corrugated iron, to the flanges or edges of which the panelling of the carriage is riveted or bolted.

[Printed, 8d. Drawing. See London Journal (*Newton's*), vol. 31 (*conjoined series*), p. 344.]

A.D. 1847, April 27.—N° 11,675.

NEWTON, ALFRED VINCENT.—(*A communication.*)—“Certain  
“ improvements in the construction of roads or ways and in the  
“ carriages to be used thereon.”

This invention relates in part to carriages suitable for travelling upon elevated rails.

“There are on each elevated railway to be four tracks for the  
“ passing of carriages, two of these to be for the main passenger  
“ carriages to pass in reverse directions, and two for other carriages  
“ denominated tenders, that are used for the purpose of enabling  
“ passengers to enter or leave the main carriages at intermediate  
“ stopping places without its being necessary to arrest the speed  
“ of the main carriages. The carriages are to be moved over the  
“ elevated railway by means of endless ropes or chains of any  
“ suitable kind, which ropes or chains are to be actuated by  
“ stationary steam engines; the cars or ropes may, however,  
“ (should it be found convenient) be propelled by other motive  
“ power.”

The invention is described at great length, and will not be fully understood without the aid of the drawings annexed to the Specification. The tenders wait at the stations or stopping places at certain times for the reception of passengers who wish to travel by the carriages, and are afterwards put in motion by the application of certain "pincer brakes" to the rope which is moving such carriages, the tender thus being gradually brought up to the same speed as the latter, and the passengers then transferring themselves thereto, while those passengers who wish to leave the carriages enter the tender, and this being again set free from the driving rope is made to stop at the next landing place, where the passengers leave it. The details of the invention are of somewhat complex character, and include certain arrangements of the framing and axle bearers of the carriages which allow the wheels to adapt themselves to curves and inequalities in the rails; also certain retaining pulleys and safety wheels, which prevent the carriages from leaving the rails; also a mode of opening and closing the doors of the carriages by means of a certain frame called a "door-keeper," and a certain shaft acting in combination therewith, these enabling all the doors (which slide to and fro) to be opened or closed simultaneously; also certain "spring latches," by which the tenders are united to the carriages when travelling with them, and to certain brake plates at the landings when stationary; and also a certain arrangement of elevators, by which aged persons, invalids, and children, may be raised to or lowered from the landings.

[Printed, 3s. Drawings.]

A.D. 1847, May 4.—N<sup>o</sup> 11,689.

TAYLOR, JOSEPH.—"A certain improvement or certain improvements in the construction and manufacture of wheels for railway and other carriages."

The first part of this invention consists in constructing inclined flanges or snugs on the interior of the tires of such wheels, to which the inclined edges of certain plates constituting the sides of the said wheels are attached; and, also, in "constructing the sides of wheels of concave plates, supported by rings or blocks of wood."

The invention consists, secondly, in a method of constructing wheels "in which the plates constituting the sides of the wheels

" are connected to a ring of wood, to which ring of wood the tire  
" of the said wheel is connected."

Thirdly, in a mode of constructing punches for cutting holes in plates for railway wheels; " that is to say, punches in which two  
" or more points only of the punches act on the plate to be cut  
" at the same time, so as to cut the said holes progressively."

Fourthly, the invention consists in constructing a drilling machine to be used in the manufacture of wheels such as mentioned above, by combining together a number of drills so as to drill the required number of holes at the same time; this part of the invention including " the use of double bands for driving the  
" said drills."

[Printed, 1s. Drawings. See Patent Journal, vol. 4, p. 4.]

A.D. 1847, May 6.—N<sup>o</sup> 11,693.

POOLE, MOSES. — (*A communication.*) — "Improvements in  
" apparatus for connecting and disconnecting railway carriages."

According to the first part of this invention a long bar or lever is mounted on a fulcrum below the front part of the frame of the tender of a train, extending forward and having its front portion passed through a slot in a piece of metal fixed under the engine, and the hinder portion of the lever passing through or having jointed to it a vertical frame, there being combined with this frame a certain forked bar and connecting joint having a tongue, the arrangement being such that should the front wheels of the engine meet with and rise over an obstruction on the rails, or run into a depression in such rails, the change of position of the end of the lever below the engine will cause the other end thereof to either raise or lower the vertical frame and so act upon the apparatus connected therewith as to disengage the tender from the first truck or carriage of the train, leaving the remainder of the latter free. A similar arrangement may be made to cause the separation of one carriage of the train from another by means of certain rocking shafts, bars, and arms, and other adjuncts which are brought into action simultaneously with the detachment of the first carriage from the tender. These arrangements are set forth at some length and in minute detail, and they embrace a mode of causing brakes to fall against the wheels of the carriages on the movement of certain sliding plates connected with the disconnecting apparatus, and also the employment of a certain late carrying rollers and

springs between each two adjacent breaks, the effect of this being that the brakes when brought down into contact with their wheels act to some extent in the manner of wedges between them. A hand lever and a cam piece, with certain minor adjuncts, are also provided for the purpose of enabling the engine-driver or conductor to bring into operation the disconnecting and brake apparatus at pleasure, but the details of all these arrangements will only be understood with the aid of the drawing annexed to the Specification.

[Printed, 10d. Drawing. See Patent Journal, vol. 3, p. 598.]

A.D. 1847, May 24.—N° 11,715.

ADAMS, WILLIAM BRIDGES, and RICHARDSON, ROBERT.  
—"Certain improvements in the construction of railways, and of engines and carriages used thereon; and also in transport and storage arrangements for the conveyance, management, and preservation of perishable articles."

This invention relates to a multitude of particulars, and includes the application of two or four or more wheeled tenders for fuel or water, constructed with a body wherein to carry passengers, or letters, or parcels of goods for hire, to attach by a swivel joint to locomotive engines on railways." Also, "the application of water or steam boilers to warm the interior of railway carriages;" the "combination of gutta percha with cast iron to form a tyre or band on the buffer heads or necks of railway carriages;" the application of moveable seats for passengers to railway carriages; "with central pivots to enter sockets in the floors;" the application of "telescopic tubes" to the roof lamps of railway carriages, "so that the lamps may be drawn down to the level of the passenger's sight," and a mode of perforating and tubing the lower glass to supply an argand burner, care being taken to proportion the exit passage for the consumed air to prevent too great an indraught." Also a mode of constructing the tyres of railway wheels "with an internal rib or flange, to retain their circular form at the outer edge of the tyre, to which the spokes or felloes of the wheels may be bolted or rivetted laterally without piercing the tread of the tyre," and a mode of blocking such tyres while heated, to give them a true circular form. Also the application to railway wheels of "cylindrical or circular turned wooden spokes, and of wooden

" felloes, the internal portion of which is a straight surface, while  
" the outer portion corresponds to the circle of the tyre, and which  
" are drawn together by bolts previous to forcing such wheel into  
" the heated tyre by mechanical pressure." Also certain modes  
of constructing bearings and axle boxes for railway wheels, " so  
" as to replace the bearings when worn," such bearings being  
in separate pieces, and " fitted to axle boxes provided with  
" spring metal collars or conical hoops or other flexible material  
" to retain the grease or oil and prevent waste." Also a mode  
of constructing " double floors " to railway carriages for passen-  
gers, " and stuffing the interstice with sawdust or other similar  
" substance to deaden the sound of the wheels." Also a mode  
of constructing close waggons " to carry grain or similar sub-  
" stance in bulk, to load near the top and discharge at the  
" bottom," and a mode of making such waggons " of specific  
" cubic contents internally, so that they may serve as measures of  
" quantity, and save labour and expense in meterage." Also the  
application of " spring tension cords or chains of links," such  
chains of links " being extended by the elastic action of disc or  
" spiral or other metallic springs, to support railway carriages on  
" their axles, and permit lateral as well as vertical elasticity," and  
certain spring frames " for resisting the tension of the cords  
" independently of the carriage frame." Also a mode of enabling  
such spring frames " to traverse laterally, and also diagonally to  
" the form of the carriage," by the pressure of the flanges of the  
central wheels of such carriage against the rails, " the movement  
" of such wheels being regulated by elastic or rigid diagonal con-  
" necting rods," and, also, the application of such diagonal rods  
to regulate the movement on curves of wheels attached to bow  
springs on railway carriages. Also the application of rollers or  
lubricated loose collars " to prevent friction on the bearing sur-  
" faces of spiral or helical springs, for the purpose of elastic bear-  
" ing, buffing, or traction to railway carriages, and the application  
" of such springs to give elasticity to tension links." Also the  
application to railway carriages of steel springs made in the form  
of hoop key rings. Also the application of the disc springs,  
formerly patented by the present patentee, " within tubes to retain  
" them in proper position, instead of a rod passing through a  
" central hole." Also improved modes of forming steel plates  
with surfaces hollowed longitudinally, " so as to construct lami-  
" nated springs without the use of slots and studs;" a mode of



constructing disc springs, which consists in forming them with a hole in the middle, and slits radiating therefrom; the application of terminus buffers to railways, consisting of disc or other springs in combination with air pistons; and the application of disc springs to terminus buffers unconnected with air pistons.

The invention embraces other particulars which do not belong to the present subject, and the whole are set forth at great length, and under various modifications.

[Printed, 2s. 6d. Drawings. See Practical Mechanics' Journal, vol. 2, p. 2, vol. 3, p. 105, and vol. 4, p. 147; Artizan, vol. 7, p. 28, and vol. 9, p. 146.]

A.D. 1847, June 3.—No 11,727.

HORNE, WILLIAM, BEADON, GEORGE, and SMITH, ANDREW.—“Improvements in wheel carriages.”

One part of this invention relates to the buffer heads of railway carriages, and consists in forming the buffer heads of one end of a carriage of concave figure, while those at the other end are convex, the convex heads of one carriage of a train thus entering the concave heads of the next when brought into contact therewith. The concave are much larger than the convex heads, and are mounted upon tubular rods, in order to “meet the resistance of any indirect concussion.”

Another part of the invention relates to forming the tyre of carriage wheels of galvanized hoop iron, “of two or more parts or thicknesses,” which are first rivetted together and then united into one mass by being “re-galvanized,” such tyres working with less noise than usual.

Axle boxes are also described as being lined or stuffed with suitable metal, hemp, leather, or other suitable material, “so as to prevent the rubbing contact of iron and iron,” this reducing the noise usually produced by the working of the axle in the box.

Carriage springs are also described as being galvanized in order to prevent oxidation; all the couplings of carriages connected with the axles and springs being also galvanized or lined with some suitable material, “in order to prevent contact of iron and iron,” and so prevent noise.

Another part of the invention relates to the construction of a timber carriage, “with framing and roof, and sawing bed attached, so that timber may be sawed up where it is felled, instead of being taken to a saw-pit,” this carriage being furnished with a windlass, and certain slings, blocks, ropes, rollers, and other



apparatus by which timber may be raised up to the sawing bed, the first wheels being removed during such operation, and the front part of the carriage being sustained by legs which are then let down to support it.

The invention further embraces the application of mechanism composed of a winch or crank, a pinion, and a wheel provided with a disc carrying studs, and acting upon internal teeth carried by a pulley, which, through the medium of certain chains and other pulleys, and certain rods or levers, may be made to raise or lower the cover of a carriage at pleasure by turning the winch or crank. Cogged wheels, a screw with a nut and chains, and a screw and lever, are all likewise set forth as applicable to this purpose.

Another part of the invention relates to the "universal tractor," described in the specification of the patent of George Beadon, of the 29th of July, 1845, and consists in applying parts of the machinery "differently arranged by an intermediate shaft and bevelled wheels, which can be put in or out of gear by the ordinary methods, and cogged wheels, band wheels, or universal joint attached by keys and couplings to the end of the intermediate shaft for driving any other machinery."

A "cart or put" is also described, which may be used either for the ordinary purposes of a cart or to sow seeds, acting as a drill when required. This cart is not boarded at the bottom, but provided with a kind of screw, which may be moved backwards and forwards by means of cams actuated by gearing driven from one of the wheels, thus distributing soil or manure over the surface of the ground upon which the cart may be moved. Worms upon a shaft driven by the same gearing may also actuate wheels on the axes of perforated rollers, through which seed may be passed, such seed being directed to the ground by tubes. The body of the cart may be tilted by means of a curved rack and a pinion, and certain flaps may be let down when it is desired to discharge a quantity of earth or dressing from the cart at one spot.

Another part of the invention relates to so hinging the parts of the enclosure of an open carriage together, that "they may pass or slide into the front seat or boot of the carriage." And the invention further embraces improvements upon the "lock or wheel plate," described in the specification of the patent granted to John Buchanan on the 28th of December, 1840, and consists in "lengthening the fuchelles and fixed sweigh bar to

"work on a piece called the hooping or perch piece," for the purpose of giving "an increased bearing for the under carriage," as also in the use of square-headed perch bolts to revolve in the top bed or hooping piece, "and front slide, not revolving in the slide or slots, as before done," the wheel plate being, by preference, galvanized.

The invention further includes fixing springs to axletrees by cranking one or more of the plates, attaching a spring to an axle by surrounding the latter with wood or some other non-conductor of sound; a mode of suspending a spring from an axle by means of a belt or cushion of leather or other suitable material; placing the short plates of carriage springs on the interior instead of the exterior of such springs, the upper spring being connected to the axle, and the lower spring to the body of the carriage, the weight of the latter thus expanding instead of closing the springs; attaching the steps of carriages to "detached shafts" instead of the bodies of such carriages; forming the fronts of carriages, "between the standing or door pillars, of curved or segmental glass," without any side windows; and a mode of hanging the doors of carriages "by hinging the door pillar to the contracted light;" "and attaching the whole or part of the fore pillar to the door."

[Printed, 2s. 10d. Drawings.]

A.D. 1847, June 3.—N° 11,732.

BERGER, SAMUEL BENJAMIN EDWARD.—(*A communication.*)—"Certain improvements in the construction of railway carriages."

After making some observations relative to the disadvantages attendant upon the use of the flanged conical railway wheels generally used, the patentee states that in order to allow the several pairs of cone wheels in a railway train to adjust themselves on the rails in a manner which will compensate for the different distances the near and off wheels have to run when passing over a curve in the line of railway, the inventor connects the steps or axle boxes to the framing of railway carriages, in such a manner that the axles of such carriages are enabled to shift their positions with respect to the frames of the carriages, abrasion of the wheel and straining of the axle being thus avoided.

(One arrangement is described in which the axle box is connected to "pendant links," these being jointed to horizontal rods or

bars, which again are jointed to other links, sustained by pins fixed in brackets projecting from the framing of the carriage, this arrangement allowing the axle to assume "other than a right angle" with the side of the carriage, but its changes of position being controlled by elastic stops. This arrangement serves the purpose in a carriage having four wheels, but for a carriage having a greater number of wheels the horizontal rods have hooks suspended from each end, links placed upon these hooks receiving the forked ends of brackets connected to the framing of the carriage, and this arrangement allowing both a horizontal and lateral movement of the axle. In both cases the pendant links are combined with apparatus resting upon the springs of the carriage, which may be of any suitable construction.

[Printed, &c. Drawing. See London Journal (*Newton's*), vol. 31 (*conjoined series*), p. 404; Patent Journal, vol. 4, p. 60; Engineers' and Architects' Journal, vol. 11, p. 46.]

A.D. 1847, June 3.—N<sup>o</sup> 11,733.

TAYLOR, GEORGE.—"Improvements in the construction of engines and carriages to be used on railways."

One part of this invention relates to improved apparatus to be applied to railway carriages for retarding and stopping the train. Two levers are attached to the bottom of the carriage, and intended to vibrate slightly upon centre pins or studs at their inner ends; these levers are connected together by a cross rod, and are thereby caused to move simultaneously when any motion is communicated to them, and flanged skids are attached to the outer ends of the levers, such skids being each provided at the under surface with a block of wood, the grain of which is vertical. A strong spring stretches across from one skid to the other, and takes into slots or openings formed in the upper part of the skids. This spring is embraced at the middle of its length by a hoop, which is jointed to a vertical shaft composed of two parts, and capable of being adjusted in its length by a threaded connecting piece. The upper end of the shaft is forked, and between its prongs two antifriction rollers are mounted. In the sides of these prongs, and between the centres of the rollers, longitudinal slots are cut for the purpose of receiving the axle of a cam, which is in contact with the peripheries of the antifriction rollers. The axle is mounted in bearings affixed to the end of the carriage, and to its outer end a worm wheel is keyed. This wheel gears into a worm mounted on

one end of a shaft which turns in bearings at the side of the carriage, and at its outer end a hand wheel is keyed for the purpose of giving it a rotary motion. Let it now be supposed that the skids are required to be let down on to the rail, the hand wheel is turned, in order, by means of the worm, to move round the wheel and its axle which carries the cam. The larger radius of this cam being now brought into contact with the lower antifriction roller, it will depress the vertical shaft, and communicate through the spring an elastic pressure to the skids, whereby they will be made to bite the rails and retard the progress of the train. When the skids are intended to support the weight of the carriage, on the breakage of an axle, they are provided with suitable check pins or stops, which relieve the machinery mentioned above from all strain. The front part of the engine is provided with a fixed skid, which will support it in case of such an accident.

Another part of the invention consists in passing the axles of a tender "through or above the water tank, whereby the weight is brought near the rails, in a manner similar to that of the engines."

Another part of the invention relates to such railway axles as are composed of two parts, one passing through the other, and consists in casting the outer upon the inner part, a collar and boss upon the latter keeping the two parts in due position, while allowing them to revolve independently of each other. Such parts may also be kept in their relative positions by the outer portion bearing at one end against the boss of one of the wheels, and against a collar on the inner portion at the other, one of the wheels being in all cases mounted upon the inner, and the other upon the outer portion of the axle.

[Printed, 1s. 2d. Drawings. See London Journal (*Newton's*), vol. 33 (*continued series*), p. 6; *Mechanics' Magazine*, vol. 47, p. 553; *Patent Journal*, vol. 4, p. 74; *Engineers' and Architects' Journal*, vol. 11, pp. 23 and 76.]

A.D. 1847, June 15.—N° 11,748.

LANE, JOHN. — "Improvements in railway carriages and engines."

This invention consists, firstly, in a mode of arranging apparatus "whereby water or other fluid is made the means of operating on a piston worked by the axles of the carriages, so as to retard or stop such piston," and consequently the wheels of such carriages.

This part of the invention may be variously modified, the cylinder being furnished with a passage forming a communication between the two ends of the cylinder, and the effect upon the piston being varied by the use of a stop cock or valve in this passage, which can be opened or closed at pleasure, and an arrangement being described in which the apparatus connected with each carriage of a train may be brought into action simultaneously through the medium of rods provided with buffing heads, "or other means of communication;" a similar arrangement being also described as applicable to bringing friction bands or straps to bear upon drums mounted on the axles of the carriages, so as to retard or stop the latter.

Another part of the invention consists of buffing apparatus, in which "water or other fluid is caused to be driven into a vessel or vessels containing condensed air;" and a further part of the invention consists in adapting screws to the purpose of adjusting the height of the bodies of railway engines and carriages, so as to bring all the buffers of a train into the same horizontal line.

[Printed, 2s. Drawings. See Repertory of Arts, vol. 11 (*enlarged series*), p. 163; Patent Journal, vol. 4, p. 100.]

A.D. 1847, June 15.—N<sup>o</sup> 11,751.

SYMONS, ALEXANDER.—"Improvements in railway carriages, "in preventing accidents on railways, and in ascertaining the "speed of carriages."

This invention is set forth at some length, and embraces a large number of particulars, of which only an outline can be given here. These include the use of two additional vertical wheels, called safety wheels, "affixed to any locomotive, and provided "with a jointed bent lever, to keep the safety wheels on the rails," certain horizontal wheels being in some cases combined with them. A system of levers and chains attached to a carriage, and certain apparatus connected therewith, "to be brought into "action by the breaking of an axle or other accident, acting from "one carriage to another, and closing the valve through which "steam is supplied to the engine, so as to stop its working." An arrangement of supports in connection with a rod, and acted upon by a bent lever to sustain a carriage from falling over. A mode of constructing, arranging, and fixing to any railway carriage in a train "an air cylinder and piston, to be used for

“connecting carriages together in a train, and also to act, by producing resistance of compressed air, as a spring in every such cylinder, as a means of preventing or subduing the effect of the collision of trains, or of violent shocks against railway carriages.” Certain mechanical arrangements “for lifting the wheels of a locomotive engine off from contact with the rails, and simultaneously placing the whole weight of the engine upon four supports, provided with shoes, resting and sliding upon the rails.” The placing in front of any locomotive, or upon a truck in the front thereof, a large air cylinder and piston, so arranged as to serve the purpose of a buffer. The construction, arrangement, and use of a new kind of buffers, called outer spring buffers, “in addition to and outside of, or without and in lieu of, the buffers in ordinary use.” Strengthening the framing of the sides, ends, and partitions of railway carriages by upright and diagonal supports of wood or iron, “so as to give sufficient strength to the carriage to carry buffer beams or tubes and rods upon or near to the top thereof.” A contrivance or arrangement for connecting the opposite buffers of carriages in a train with each other “by means of two pins or rods affixed to the buffers, and a clamp or clasp passing over them and attaching them firmly to each other by means of a worm and screw.” A particular mode of securing the tyres of wheels of locomotives and railway carriages “so as to prevent their flying off in the event of a fracture.” The connecting of railway carriages to each other “at two points at each end and near to the outside, to be used as points of traction, instead of at one point in the centre,” and the use of the outer spring buffers mentioned above as the two points of such connexion, together with certain modes of constructing and arranging buffer rods and beams or tubes, and placing them at the upper parts of locomotive engines, carriages, trucks, or other vehicles.

[Printed, 2s. 4d. Drawings.]

A.D. 1847, June 28.—N<sup>o</sup> 11,769.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—“Certain improvements in manufacturing wheels.”

This invention “consists in a peculiar method of casting iron wheels for locomotive engines and railway carriages, the particular object of which is to cool uniformly all parts of the



A.D. 1847, July 26.—N° 11,815.

DE BERGUE, CHARLES.—“Improvements in buffing and traction apparatus, and in springs for railway and other carriages.”

The first part of this invention consists in an improved mode or modes of constructing such buffers or buffing apparatus for railway carriages as are constructed with springs made of rings of india-rubber, or of other similar elastic material. The rings should be made so as to leave a small space between their inner surfaces and the rod which is to slide within them, for the purpose of allowing the rod to slide backwards and forwards with facility, and the rings must also be made so as to leave a sufficient space between their exterior surfaces and the inside of either of the cylinders, within which they may be placed so as to expand when the buffing apparatus is subjected to pressure. The sectional area of the ring may (when not under compression) be a square, that patentee stating that a ring of this form will be found to be more generally useful than any other, but that other forms may be adopted, and plates are placed between the elastic rings, for the purpose of keeping them separate and enabling them to exercise their elastic powers or properties independently of each other. These plates are made with rims on each side at their inner edges, for the purpose of keeping every part of the elastic rings at equal distances from the rod, and they may be strengthened by rims formed on their outer edges.

Another part of the invention relates to a mode of forming the traction apparatus of railway carriages, “which are constructed with, or have attached thereto springs made of india-rubber or other such similar elastic material,” the essential feature of this part of the invention being the employment of an elastic ring or elastic rings, composed of india-rubber or other suitable material, and enclosed between plates of metal through which the “draw rod” is passed. And another part of the invention consists in forming bearing springs for railway and other vehicles by the employment of elastic rings combined with metal plates, as mentioned above, various modifications of the different parts of the invention being described.

[Printed, 1s. 6d. Drawings. See Practical Mechanics' Journal, vol. 3, p. 69; Artizan, vol. 5, pp. 87 and 130, and vol. 8, pp. 84 and 135; Patent Journal, vol. 4, pp. 224 and 248.]



A.D. 1847, July 29.—N° 11,819.

**BAINES, WILLIAM.**—"Improvements in the manufacture of " parts of railways, and in bearings of machinery, and in apparatus used in constructing railways."

One part of this invention relates to improvements in the construction of waggons or trucks "for conveying earth along a line " of railway to facilitate the construction thereof," these trucks or waggons having the bottom so formed that part of the load " may be tilted outwards on either side of the waggon or truck, " whilst the other part of the load can be discharged in the " middle."

The bottom of the truck or waggon is composed of "four " moveable parts," two of which are higher than the others, and form those portions of the bottom which are over the bearing wheels, the higher and lower parts of each side being connected by arms and links so as to move simultaneously in discharging the load, and being apparently retained in position at other times by a lever and certain apparatus connected with a screw upon which is a hand wheel or winch, this latter part of the invention, however, not being very clearly described.

The other parts of the invention contain nothing which requires notice here.

[Printed, 2s. 8d. Drawings. See Patent Journal, vol. 4, p. 289; Artisan, vol. 7, p. 16 (with Disclaimer).]

A.D. 1847, August 19.—N° 11,836.

**ETON, EDWARD WILLIAM.**—"Certain improved machinery for " preventing accidents on railways."

This invention consists of an improved system of breaks "for " bringing up a train more rapidly than those now in use," this improved system "involving the new principle of having a fixed " break on a moveable frame stay or carriage body, instead of a " moveable break on a fixed frame stay or carriage body," the object being "to relieve the breaks by raising the frame stay or body of " the carriage or engine, and to put on the breaks or bring them " into action by lowering the frame or carriage body; or to relieve " them by the lowering action and put them on by the raising, as " the case may be."

One modification of the invention is described as applicable to a locomotive engine or tender, in which the breaks are composed of bent wrought iron tubes containing water, and fitted with

safety valves. Such breaks may be placed above the wheels, being connected to the framing or other suitable part of the engine or tender, and brought into action upon the wheels by lowering such framing or other part; or they may be so arranged as to act on the lower parts of the wheels, in which case they are brought into operation by raising such framing or other part. This raising or lowering of the frame is effected by means of an arrangement of screws, to which are connected levers, these being moved simultaneously when requisite, through the medium of certain longitudinal bars, and levers which are acted upon by a piston, mounted in a cylinder and supplied with steam from the boiler of the engine.

Breaks of a similar description are also set forth as being applied to railway carriages, the screws in this case having upon them levers which are acted upon at or near one end by the tug rods of the carriage, and at or near the other by rods which are brought into operation by the buffers, the result of the arrangement being that on the tug rods being pulled forward in drawing along the carriage the screws are so turned as to release the breaks from the wheels, by raising or lowering the body and frame of the carriage, as the case may be, while upon the action of the tug rods ceasing, and the buffers being brought into play, through a slackening of the speed of the engine (for example) the screws are so turned as to press the breaks upon the wheels. The buffers are made to act upon the levers of the screws through the medium of certain cross levers and longitudinal rods, an arrangement of tumbling clicks and inclined planes connected with this part of the apparatus preventing it from acting to a greater extent than is necessary. And when it is desired that a carriage shall be capable of being "drawn forward" by either end," the tug rods are combined with clicks and inclined planes of the same character, and breaks placed both above the wheels and also so as to act on the lower parts thereof, these being used alternately, according to which end of the carriage is placed in front. The details of the invention are minutely described.

[Printed, 1s. 10d. Drawings. See Patent Journal, vol. 4, p. 326.]

A.D. 1847, August 19.—N<sup>o</sup> 11,843.

WEBSTER, JAMES.—"An atmospheric buffer to be applied to carriages and all other vehicles travelling on railways."

According to this invention the buffer head is mounted at one end of a rod, at the other end of which is a piston placed in a suitable cylinder, the piston being made air-tight in the cylinder by means of a "cupped leather," and a certain disc of india-rubber connected therewith by certain screws. In that part of the piston rod which passes through the piston is an opening communicating with the atmosphere, which opening, however, is furnished with a spring valve, and a strong spiral spring is placed between the inner or lower surface of the piston and the bottom of the cylinder, the result of the whole arrangement being that on the buffer being pushed inwards the air behind the piston is compressed, as also the spiral spring, the latter, with the compressed air, afterwards returning the piston to its first position, and the opening in the piston and rod serving to restore such air to the space behind the piston as may have escaped past it during the compression, the spring valve allowing such restoration.

[Printed, 8d. Drawings. See Repertory of Arts, vol. 11 (*enlarged series*), p. 149; Practical Mechanics' Journal, vol. 3, p. 69.]

A.D. 1847, September 2.—N<sup>o</sup> 11,847.

CHABOT, CHARLES.—"Improvements in railway carriages, and  
"in the buffers and other apparatus connected with such car-  
riages."

The first part of this invention relates to arrangements for retarding and stopping the motion of railway carriages. Fixed upon one of the axles of each carriage is a disc which rotates therewith, and on each side of this disc is an "annular piece," these pieces being so arranged as to be pressed against the disc by springs and rotate with it during the ordinary motion of the carriage, but being furnished with projecting studs by which they can, when it is desired to check or stop the carriage, be prevented from so rotating, when the friction which arises between them and the disc produces the requisite effect. The studs are operated upon through the medium of arms, which by means of a cam piece mounted upon a horizontal rod may be brought into contact with or removed from them at pleasure, this rod being acted upon by gearing which may be turned by the guard or breakman, and the arms being mounted on rods capable of sliding to and fro, and connected with apparatus whereby, when they are struck by the studs on the annular pieces, they, as well as the

horizontal rod mentioned above, are allowed to move slightly so as to prevent too great a concussion, a spring being thus compressed which then restores them to their first positions. Suitable means are provided of connecting the break apparatus of one carriage with that of another, and a modification of this part of the invention is described in which a flanged wheel round which a break strap is passed is used in place of the disc and annular pieces mentioned above. Arrangements are also described by which the guard or breaksman may by slackening the speed of his own carriage cause the breaks of the rest of the carriages in a train to be brought into action, these arrangements embracing a number of springs, bars, additional draw rods, and other mechanism the action of which will only be understood with the aid of the drawings annexed to the Specification; one arrangement including the application of ordinary breaks to the carriage wheels through the medium of excentrics actuated by levers in connection with the draw rods.

The invention further includes a mode of constructing buffers which are capable of locking into each other; the employment of an "elastic bearing" for buffer rods which allows them a "slight lateral play" in case of need; "stationary locking pieces for keeping the carriages in one continuous line;" a coiled spring placed in a box, and serving as a buffer spring; the application between axle boxes and their guide plates of a layer of india-rubber or other elastic substance so as to ease the axles and wheels in passing round curves, and also certain modes of constructing coupling links, in one of which "the pieces to be connected are each provided with a screw, which enters a tapped hole in its fellow piece provided to receive it," the pieces being attached to chains the links of which receive the hooks of the draw rods; while in another arrangement certain additional draw rods are used, which are provided with links capable of turning independently of their rods, and tapped to receive the screwed ends of such rods.

[Printed, 1s. 8d. Drawings. See London Journal (*Newton's*), vol. 33 (continued series), p. 25.]

A.D. 1847, September 2.—No 11,849.

WARD, WILLIAM SYKES.—"Improvements in communicating motive power, which are applicable to working signals and breaks on railways, and also improvements in communicating

" intelligence, signals, and motive power by the agency of voltaic  
" electricity."

One part of this invention consists in "employing the motion  
" of the railway train for working railway breaks." A wheel or  
pulley is fixed to one of the axles of a carriage, and a second  
wheel or pulley is placed loosely on the same axis, so as to be  
readily brought into contact with the first-mentioned pulley, such  
second pulley, through the medium of a third pulley, a chain,  
and an elastic arm, forcing the breaks into contact with the  
wheels of the carriage, "the size of the pulleys being so adapted  
" as to slip when sufficient pressure has been communicated to  
" the break, thus bringing the breaks to bear with rapidity and  
" certainty, and by a slight application of power by the breaks-  
" man." A grooved boss connected to the second pulley, and  
acted upon by a pinion, serves to place the pulleys in contact.

Another part of the invention consists in the use of "torsion  
" rods," connected at the ends by universal joints, clutches, or  
other suitable couplings, and extending beneath the carriages of  
a train in such manner as to be capable of not only conveying  
signals from one part of the train to another, but also of simult-  
aneously bringing the breaks of the train into action when  
turned by the breaksmen or guard, such breaks being of either  
the ordinary character, or such as those mentioned above, and  
another application of such torsion rods is described in which  
they are made to withdraw bolts or connecting pieces and so dis-  
engage breaks which have been brought into action upon the  
wheels by buffers, this arrangement rendering a backward motion  
of the train, in order to disengage such breaks, unnecessary. The  
rest of the invention does not require notice here.

[Printed, 2s. Drawings. See Repertory of Arts, vol. 11 (*enlarged series*),  
p. 223; Patent Journal, vol. 4, p. 402.]

A.D. 1847, October 7.—N° 11,885.

PEARSON, JAMES. — "Certain improvements in locomotive  
" engines and carriages."

According to one part of this invention the axle of the driving  
wheels of a locomotive engine is placed in the middle of the  
boiler, the axles of the trailing wheels being below the cylindrical  
part of such boiler, two pairs of trailing wheels being placed in a  
swivel frame at each end of the engine, the invention including  
the use of a compound swivel frame, with a coupling rod, and a

certain combination of springs or cushions and "attachments" which connect one frame with the other; guides and end links being also mentioned as forming part of the arrangements employed. The rest of the invention does not belong to the present series of Abridgments.

[Printed, 1s. 2d. Drawings. See *Repertory of Arts*, vol. 11 (*enlarged series*), p. 269; *Artizan*, vol. 6, p. 106; *Patent Journal*, vol. 4, p. 500; *Engineers' and Architects' Journal*, vol. 11, p. 107.]

A.D. 1847, October 28.—N° 11,927.

EVANS, EDWARD.—"Improvements in wheels for railway and "other carriages."

According to this invention the tyre or hoop of the wheel is connected with the spokes or with the inner rim or periphery "without the use of bolts or rivets." When an inner ring is used such ring is formed with a dovetail projection on each of its outer edges, the tyre having in its inner surface a dovetailed recess to receive the outer part of the ring, with the projections. When an inner ring is not used, the ends of the spokes carry projections which, with the ends of the spokes, enter a similar groove in the tyre. The projections are in each case made of such size as to easily enter the groove in the tyre when the latter is expanded by heat, and as this still leaves some space between the projections and the sides of the groove, such space is filled after the cooling of the tyre by running into it melted metal. When an inner ring is used, it may either be composed of an entire ring previously formed, or of segments.

[Printed, 6d. Drawing. See *London Journal* (*Newton's*), vol. 32 (*continued series*), p. 415; *Mechanics' Magazine*, vol. 43, p. 441; *Practical Mechanics' Journal*, vol. 1, p. 57; *Patent Journal*, vol. 5, p. 128; *Engineers' and Architects' Journal*, vol. 11, p. 180.]

A.D. 1847, November 2.—N° 11,934.

DUNN, THOMAS.—"Improvements in the manufacture of railway wheels and axles, and in machinery and apparatus for "placing carriages on to a line of rails, for removing them from "one line or rails to another, and for turning them."

One part of this invention relates to an improved construction of railway wheels, in which the felloe of the wheel and the inside of the tire are made "to fit into one another," the space between them being filled with packing "to allow for the variations in

“ contraction of the different parts of the wheel, and to diminish  
“ the vibration, concussion, and cost of the wheel.”

Another part of the invention relates to the construction of wheels made of wood and iron, projections being cast in the mortices of the naves, and recesses cut in the wooden sectors, wedges being used for forcing the recesses of the sectors on to the projections.

The invention also includes the use of a wooden axle with metal journals, and of bars of iron bent at each end to make the spokes of wheels; also, a mode of casting an axle in one piece with the two naves or with the two wheels with which it is to work, and forming an axle of three or any convenient number of bars of iron connecting the naves of its wheels, the ends of these bars passing through the naves and being riveted thereto, or secured by screw nuts.

These arrangements are all fully described, and are capable of being variously modified.

[Printed, 1s. 4d. Drawings. See *Mechanics' Magazine*, vol. 48, p. 463; *Practical Mechanics' Journal*, vol. 2, p. 153; *Patent Journal*, vol. 5, pp. 121 and 152; *Engineers' and Architects' Journal*, vol. 11, p. 169.]

A.D. 1847, December 22.—N<sup>o</sup> 12,000.

**WRIGHTON, RICHARD.**—“Improvements in apparatus to be applied to railway carriages and engines.”

This invention consists, firstly, in a “combination steam break,” the essential feature of this part of the invention being composed of a cylinder and piston, so arranged in connection with a four-way cock that on steam being admitted to one side of the piston breaks connected therewith are simultaneously applied to all the carriages of a train, being removed therefrom by allowing the steam to act upon the other side of such piston.

Secondly, the invention consists in a mode of constructing and arranging the buffers of railway carriages, a single central buffer, in combination with a draw rod and spring, being in some cases used, while in other cases an “improved coupling,” in place of two side buffers, is employed, this coupling consisting essentially of a barrel containing certain springs.

Thirdly, in “the use of springs or other elastic substances in combination with adjusting screws, for making couplings for railway carriages,” a “double joint” with adjusting screws being included in this part of the invention.



Fourthly, in the employment of a metallic ring in combination with a ring formed of elastic material, so applied as to prevent the escape of grease from the axle box.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 30, p. 94; *Practical Mechanics' Journal*, vol. 2, p. 71; *Patent Journal*, vol. 5, p. 125; *Engineers' and Architects' Journal*, vol. 11, p. 246.]

A.D. 1848, January 5.—N° 12,013.

DE BERGUE, CHARLES.—“Improvements in carriages used on railways.”

One part of this invention consists in so constructing axle guards and axle boxes for railway carriages “that the bearing or working surfaces between them shall consist the one of hard wood, the other of metal,” this part of the invention embracing also the constructing of axle guards “by combining two wrought-iron bars with a plate of cast-iron clipping the two.”

Another part of the invention consists in forming “the conical centres of separating plates (used in the construction of india-rubber springs for railway carriages) of soft metal cast in a mould.”

Another part of the invention relates to a mode of constructing a buffing apparatus applicable to carriages to be used on railways, wherein the resisting power of the buffers is produced by a friction break “so combined as to effect an increasing amount of resistance through the range of the stroke and producing no recoil action.” In this arrangement the buffer rods are made to act through the medium of racks upon pinions mounted upon a shaft on which is also a friction pulley, there being passed spirally round this pulley certain friction bands, and the effect of the whole arrangement being that on the buffers being brought into action the friction pulley is turned round inside the friction bands, which, again, are gradually drawn tighter upon the pulley as the buffers are driven backwards by the action of a cam and certain apparatus connected therewith. The details of the invention may be varied.

[Printed, 1s. 6d. Drawings. See *Repertory of Arts*, vol. 12 (*enlarged series*), p. 97; *Artizan*, vol. 6, p. 228; *Patent Journal*, vol. 6, p. 109; *Engineers' and Architects' Journal*, vol. 11, p. 247.]

A.D. 1848, January 7.—N° 12,017.

BELL, GEORGE.—“Certain improvements in the arrangement of wheels and axles for steam and other carriages, which facili-

"tates travelling on railways and common roads, parts of which  
"improvements are applicable to other machinery."

[No Specification enrolled.]

A.D. 1848, January 13.—N° 12,025.

HEATH, ROBERT.—"Certain improvements in the method of  
"applying and working friction brakes to engines and carriages  
"to be used upon railways."

According to one part of this invention the brakes are capable of aliding upon a bar, and are actuated by means of rods connected to short levers keyed upon a transverse shaft, motion being given to the said shaft by means of a lever which would be worked under the ordinary system by manual labour, "exerted through  
"the agency of a screw, and other gearing connected therewith," but which, according to the present invention, is brought into action by a weighted lever and certain appendages connected therewith.

Another method of applying brakes, without the intervention of the guard or any other person on the train, and which may be used to stop a train in cases where the guard could not be conveniently signalled or communicated with, consists in applying, at a short distance from each station, and at other places where it may be considered requisite, an inclined rail, which is placed about mid-way between the ordinary rails. When it is desired to stop an engine, carriage or train, the pointsman or other person must raise this rail by means of a lever, and as the engine or carriage passes over it the inclined part of the rail acts against a friction roller mounted at the lower end of a bar depending from the carriage or engine, the said bar releasing a certain wheel, and thus allowing the weighted lever above-named to exert its force and put on the brakes. These arrangements may be variously modified.

[Printed, 1s. Drawings. See Patent Journal, vol. 5, p. 229; Artisan, vol. 6, p. 227; Engineers' and Architects' Journal, vol. 11, p. 304.]

A.D. 1848, January 18.—N° 12,029.

LISTER, SAMUEL CUNLIFFE. — "Improvements in railway  
"trains and other carriages, and generally where a lifting power  
"or pressure is required."

One part of this invention consists in a mode of applying brakes to all the wheels of a railway train simultaneously, which

is effected by the employment of a tank into which air is compressed by means of a pump worked by one of the axles of the guard's carriage, in which the tank is by preference placed, suitable pipes communicating with this tank and conveying the compressed air (upon the opening of a valve by the guard) to cylinders in which are pistons connected to brakes, the latter being thus pressed upon the carriage wheels. Each carriage is furnished with an air pipe, and the pipes of the various carriages in a train are so jointed together as to admit of the passage of compressed air from one end of the train to the other. Nearly the same effect may be produced by creating a vacuum in the pipes, and causing the atmosphere to press upon the pistons.

By a disclaimer which was enrolled on the 17th July, 1848, the patentee removed from the title of this invention the words "and" "other carriages, and generally where a lifting power or pressure" "is required," on the ground of that part of the invention which was to have been described in pursuance of those words being wanting in utility.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 33 (*conjoined series*), p. 36; Repertory of Arts, vol. 12 (*enlarged series*), p. 179; Artizan, vol. 6, p. 240; Patent Journal, vol. 5, p. 234; Engineers and Architects' Journal, vol. 11, p. 304 (with Disclaimer).]

A.D. 1848, February 10.—N° 12,063.

**CANNON, WILLIAM JEARY.** — "Improvements in the construction of carriages for the conveyance of sheep and other animals on railways."

This invention consists, "in respect to cattle trucks, of introducing an open flooring of transverse or lateral bars, slightly reeded or ridged, so as to secure a sure footing for the cattle, composed of galvanized cast iron or other metal or wood, through which bars or open floors the urine and dung may pass into a vessel or tank to be attached to the bottom of the carriage, from which vessel or tank the contents may be drawn off by means of a tap or cock or sluice, and deposited in a reservoir or tank to be provided for the purpose, thus advantageously collecting the valuable manure now lost."

This description applies to the construction of new carriages, but the invention may be applied to existing trucks or carriages by placing a flooring such as that mentioned above over the ordinary floors of such carriages or trucks, and lining the latter and a portion of the sides of such trucks or carriages with metal, so as

to form thereof a tank or wall for the reception of urine and other matters.

[Printed, 4d. No Drawings. See London Journal (*Newton's*), vol. 22, *conjoined series*), p. 195; Patent Journal, vol. 5, p. 366.]

A.D. 1848, March 8.—N° 12,082.

SEEGERS, THEODORUS CORNELIUS.—“Improvements in the construction of railway carriages.”

This invention, consists, firstly, in the adaptation of “strong longitudinal beams extending the whole length of such carriages, arranged and connected together by transverse and perpendicular beams, with brackets and braces to form the framework or skeleton of the carriage.”

With these are connected certain standards, and between the latter and the lining of the carriage is a packing of “wool” or other elastic material. Transverse beams are also placed outside the carriage, and covered with india-rubber or other elastic material, so as to “act as additional buffer,” the carriage being further strengthened by the door cases being lined with frames of wrought iron, brackets and wrought-iron plates being also introduced in various ways for the purpose of binding together the whole structure. Certain transverse beams form framework for supporting the axles of the wheels, the body of the carriage resting upon springs in the ordinary manner, and the wheels of the carriage are made of “wrought iron by means of stamping, so that the entire wheel is formed from one piece without joints.”

Another part of the invention consists in “the construction of internal boxes or shells, forming distinct compartments of the carriage,” independent of the frame in which they are fixed, and the use of internal doors or other securities to every sitting within the carriages,” suitable packings being provided “for the purpose of preventing the passengers being thrown from their seats or injured by any sudden stoppage or concussion of the train.”

[Printed, 10d. Drawing. See *Artisan*, vol. 7, p. 57; and Patent Journal, vol. 6, p. 16.]

A.D. 1848, March 8.—N° 12,089.

McCONOCHIE, JOHN, and CLAUDE, LOUIS JAMES.—“Certain improvements in locomotive engines.”

One part of this invention relates to a mode of forming the crank axle of a locomotive engine and attaching the same to the

driving wheels. The cranks "are put, as usual, at right angles " to each other, but occupy positions much nearer to the wheel " than usual, and instead of being returned so that the third side " of the crank may be brought down to enter the central boss or " eye of the wheel " " it is inserted into a supplementary boss." The place in the central boss usually assigned to the end of the crank shaft is occupied by journals which serve as bearings to the engine, and such journals may, if desirable, "be made in one " piece with the wheel." The patentees mention that by this arrangement they are enabled to "place the axial line of the " cylinders further apart (that is to say, by all the thickness of " the two outside cheeks of the crank), and consequently to have " the barrel of the boiler proportionately low."

Another part of the invention relates to a mode of regulating the weight upon the driving and trailing wheels of an engine, this part of the invention being only applicable, however, to engines having six or more wheels. A toggle joint is placed intermediately between the bearings of the axles of the trailing wheels and the springs of the carriage, which is sustained by the trailing wheels, being also suitably connected to the engine frame, a rod connecting the knuckle of the toggle joint with the rod of a piston mounted in a small cylinder, to which either steam or hot water may be admitted from the boiler of the engine at pleasure. The admission to or passage from this cylinder of steam or water has the effect of altering the position of the toggle joint, and so bringing the weight of the locomotive more or less upon the driving or trailing wheels, as may seem desirable.

Another part of the invention consists in a mode of applying the brakes of a railway train by means of steam, which may be admitted into tubes arranged below the tender and carriages of such train. Different modes of carrying out this part of the invention are described, in some cases pistons and cylinders being used to actuate the brakes. And the tube of one carriage may be connected with that of another by having the end of one inserted into an enlarged portion of the next, an "annular spring" of vulcanized caoutchouc being so arranged as to form a steam-tight joint.

Another part of the invention consists in an improved form of coupling for railway engines and carriages, two screws, such as ordinarily employed in couplings, having hoops forged on their inner ends for the reception of eccentrics, these being actuated

when necessary by a lever, and serving to expand or contract the coupling; the necessity for "slacking back" in order to detach the coupling being thus obviated.

The invention also embraces certain arrangements of the cylinders and other working parts of locomotive engines, all of which are set forth at some length, but these arrangements do not require notice here.

[Printed, 3s. 6d. Drawings. See *Mechanics' Magazine*, vol. 49, pp. 299 and 313; *Artizan*, vol. 6, p. 275; *Patent Journal*, vol. 5, p. 385; and *Practical Mechanics' Journal*, vol. 1, p. 181.]

A.D. 1848, March 11.—N° 12,094.

ASHBURY, JOHN.—"Certain improvements in the construction and manufacture of wheels for use upon railways and common roads, and in the preparation and construction of the tyres used thereon."

This invention consists, firstly, "in employing certain novel combinations of wood and cast or wrought iron in the construction of wheels," by which such wheels "are rendered permanently elastic, the various strains to which they may be subject are more equally distributed, and their dismemberment, should the tyre become worn or broken, or should it be removed altogether, is prevented." Secondly, in a novel method of constructing railway wheels "by arranging the various parts of which they are composed within the tyre, in securing the 'arms' or 'spokes' by means of wedges driven up between them from the centre of the wheel, and in causing the nave of the wheel to act in such a manner that their contact with the inner circumference of the tyre is continuously effected; an especial feature in the construction of wheels upon this principle being that the wheel is not completed first, and the outer tyre then made red hot and allowed to contract upon it, but the tyre is laid down 'cold,' or in that state in which after welding it is delivered by the makers, and that the various portions of which the wheel is constructed are arranged within it in this state, consequently the liabilities to sudden breakage arising from the unequal contraction of the tyre when cooled by artificial means, as in ordinary practice, are removed." Thirdly, in "certain novel methods of securing the tyres of wheels." Fourthly, "in constructing the tyres of railway wheels with certain novelties of shape or form, whereby their 'hold' upon the wheel is more



out of one piece of rolled iron part of the felloe and part of one of the spokes. The forming out of one piece of rolled iron part of the nave and part of one of the spokes. The employment of two indented collars to receive the ends of the spokes, and the welding of them together. A wheel "of hammered or rolled plate or plates of iron, when the said plate or plates, forming the part between the spokes and the rim of the wheel, is or are welded either to the outer rim or to the nave, or to both of them; or when the rim and that part between the rim and the nave are in one piece, and also when those two last-named parts are in one piece with the nave." The inserting of the nave into wooden wheels by means of a press, and then forcing out the wooden segments against the tyre. Making the tyres of wheels of wrought iron or steel, bent and welded into continuous rings and finished by hammering, so as to obviate the necessity of turning such tyres in a lathe. The securing of the tyre to the felloe, or to the spokes, or to the rim and spokes, by projections formed either at intervals or continuously on the inside of the tyre. The forming of the wheels of a combination of iron and gutta percha, or any of the compounds of gutta percha suitable for the purpose. The combination of wrought-iron bosses and tyres having inclined flanches, and also certain methods of forming and welding such wrought-iron bosses and tyres. Also forming the nave, the spokes, and the felloe of two pieces of rolled iron, welded together; forming the nave and portions of all the spokes in one solid piece of iron; and the formation of the nave and a portion of each spoke "by hammering."

As regards axles the invention includes:—Making the axles of the wheels of railway carriages and waggon "of steel and wrought-iron ingots." Encasing axles in wood "in order to prevent or diminish vibration." The employment of auxiliary stay rods, reaching horizontally from one wheel to the other, for the purpose of keeping the wheels together in the event of any fracture of the axle. Enclosing the parts of axles between the wheels in cylinders, and staying the wheels by diagonal rods connected to a central collar on the axis. The employment of long working bearings "to enable railway wheels to run loosely on the axles, whether the axles themselves revolve or are fixed." And, the inserting between the nave of the wheels and the axle cushions of gutta percha, vulcanized india-rubber, or other elastic substance "made to prevent vibration."



As regards springs the invention embraces:—The employment of a liquid in the cylinders of compressed air-springs, “to form “ a hydraulic joint or packing for the piston or ram to work “ through, and so to prevent the leakage of air from the cylinders.” A method of applying steel springs in combination with elastic pistons working in a cylinder, and the employment of wrought-iron cylinders in combination with buffer springs. The constructing of air cylinder springs, with an elastic air-proof diaphragm, to prevent the leaking out of the air from the cylinder. The employment of bars of steel for springs of a girder section having ribs or flanches. The constructing of spiral springs in the conical forms of diminishing spirals, and their application to buffer, bearing, or draw springs.

With respect to goods waggons the invention includes:—Constructing the bodies of goods waggons of single plates or panels of iron, attached by screws to the inside of a framing of fire-proof and indurated wood. The construction of a sliding opening in the roof of goods waggons, combined with sliding openings in the sides thereof. Certain modifications in the mode of opening the sliding portions of the roofs of the goods waggons described in the Specification of the patent granted to the present patentee on the 30th of August, 1846. The employment, for the covering of goods waggons, “of sheets of gutta percha, or of any “ waterproofed textile fabric, or of any other flexible waterproof “ substance or material capable of having a sheet form given to “ it, mounted on rollers or otherwise, so as to be drawn to and “ fro to any desired extent over the top of the waggon;” or of a series of strips of iron “overlapping one another, and mounted “ so as to be rolled back at pleasure to any required extent.”

With respect to vessels of capacity for the storing and conveyance of combustible substances the invention consists in the use of certain improved fireproof waggons for the conveyance on railways of gunpowder and other combustible substances, “having a safety magazine inside, insulated by water or carbonic “ acid gas,” certain portable apparatus for the storing and conveyance of such substances, and the addition to vessels employed in the storing of gunpowder and other combustible substances of an instrument for withdrawing small quantities at a time.”

[Printed, 7s. 6d. Drawings. See *Mechanics' Magazine*, vol. 40, p. 385; *Artizan*, vol. 7, p. 82; *Patent Journal*, vol. 6, p. 50.]

A.D. 1848, April 15.—N° 12,123.

**FORSYTH, THOMAS.**—"Improvements in the manufacture of "railway wheels."

This invention consists in manufacturing "solid wrought-iron wheels for railways, each wheel when made being of a solid "single piece of iron, and forged by means of cones or rollers "acting upon such piece.

Different modes of carrying out the invention are described, in some cases the wheel being formed from a flat circular plate, and in other cases from "piles" of metal. The rollers may be of different forms, and different arrangements of machinery used for actuating them, but one arrangement is described in which conical rollers form the sides and nave of the wheel, cylindrical rollers or guide pulleys regulating the diameter and forming the outer periphery of such wheel.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 13 (*enlarged series*), p. 280; Mechanics' Magazine, vol. 49, p. 390; Artizan, vol. 7, p. 53; Patent Journal, vol. 6, p. 21.]

A.D. 1848, April 15.—N° 12,124.

**GREEN, CHARLES, and NEWMAN, JAMES.**—"Improvements "in the manufacture of a part or parts of railway wheels."

According to this invention the tyre of a railway wheel is formed in the first place with a rib or flange projecting horizontally from that side of the tyre on which is the ordinary flange, there being on the inner edge of the opposite side another rib projecting inwards, and the felloe of the wheel having been placed within the tyre, with one side thereof against the latter rib, the whole wheel is then placed in a large lower die, and operated upon by upper dies until the rib or flange first named is bent inwards, so as to securely enclose the felloe between it and the other rib. If preferred, hammers may be used instead of the upper dies.

[Printed, 1s. 6d. Drawings. See Repertory of Arts, vol. 14 (*enlarged series*), p. 7; Mechanics' Magazine vol. 49, p. 301; Artizan, vol. 7, p. 53; Patent Journal, vol. 6, p. 35.]

A.D. 1848, April 15.—N° 12,125.

**MADIGAN, RICHARD, and HADDAN, JOHN COOPE.**—"Improvements in the manufacture of wheels for railways."

This invention has reference, firstly, "to wrought-iron disc "wheels," and consists in making the disc of wrought iron, with

the circumference bent to form a rim or felloe for supporting the tyre; in making the disc of wrought iron with a rim or felloe formed by forging, upsetting, or otherwise thickening the edge of the disc for supporting the tyre; in making the disc of wrought iron with the circumference thereof fitted against and rivetted to a ribbed tyre; in forming the nave by forging the disc with a boss or swell on one or both sides of the centre, or by welding to the centre of the disc or boss a cheek on one or both sides; and in forming the nave of cast iron; by running or casting the metal upon one or both sides of the disc.

The invention relates in the second place to wrought-iron spoke wheels, with wrought-iron naves, and consists in welding the inner ends of the spokes flatways against and on to the sides (or front and back) of a solid hoop or nave, and with the outer extremities welded to an inner rim or hoop, or to a ribbed or feathered tyre, in the manner set forth in the Specification of the Patent granted to George Cottam, on the 5th of December, 1837; in welding the inner ends of the spokes into a nave, cut or formed with grooves or spaces for their reception; in forming the nave and spokes of bars of wrought iron rolled with swelled or thickened parts, of such shape that when cut into lengths, and the said lengths are radially disposed, such swelled or thickened parts may form the nave, and the other portions of the lengths may form the spokes, or the spokes and portions of an inner rim for supporting the tyre; and in welding the outer extremities of the spokes of such wheels to ribbed tyres, under Cottam's process before mentioned.

Thirdly, the invention relates to wheels with frames or bodies composed of wrought and cast iron, or of cast iron only, and consists in pouring or running a layer or thickness of cast iron upon a disc or sheet of wrought iron; and in forming or moulding the body of a cast-iron wheel within the tyre, by pouring or running the cast iron forming the body of the wheel within or against the inner side of the tyre.

[Printed, 2s. Drawings. See *Mechanics' Magazine*, vol. 49, p. 391; *Artizan*, vol. 7, p. 37; and *Patent Journal*, vol. 6, p. 33.]

A.D. 1848, April 20.—No 12,129.

BRITTEN, JOHN.—"Certain improvements in heating, lighting, ventilating, and closing and securing the doors of apartments, also in lighting and ventilating carriages, parts of which improvements are applicable to other like purposes."

One part of this invention, which requires notice here, consists in an improved arrangement of carriage windows, "calculated to prevent draughts when open," such windows opening upon vertical hinges or joints, instead of rising and falling in the usual manner. Such a window may be made in two parts, "like folding doors," such parts being either hinged to the frame of the door or to the fixed parts of the carriage. "Whichever way the carriage is moving, the window having its hinges forward should be opened to any required angle, by which means the carriage may be ventilated without creating any objectionable amount of draught."

These windows may be applied to either railway or other carriages, and a "projecting roof," may be placed over such window, there being holes in the under side of such roof into which a bolt may be pressed by a spring when the window is "partially open and not held by hand;" or, instead of such holes, catches may be so arranged as to receive a bolt or other apparatus, by which the window may be held open at any desired angle.

Other parts of the invention embrace improvements in stoves, and also a mode of ventilating a room by means of certain arrangements connected with the fire-place; also an improved gas burner; a candle guard "to prevent candles from guttering when exposed to draughts;" various arrangements of door springs, combined with curved inclines and rollers, knuckle joints, and other apparatus; and also various arrangements of locks, latches, and other fastenings for doors, including certain locks applicable not only to doors, but to desks and drawers. All these particulars are set forth at great length, but do not in any way relate to the subject of the present series of Abridgments.

[Printed, 8d. Drawings. See Artizan, vol. 7, p. 82; Engineers' and Architects' Journal, vol. 11, p. 370; and Patent Journal, vol. 6, p. 51.]

A.D. 1848, April 27.—N<sup>o</sup> 12,133.

**PRATT, DANIEL KICE.**—"Machinery for connecting railway carriages."

The essential features of this invention consist in the use of an eccentric hook, and a cam or projection, or any mechanical equivalent or equivalents therefor, in combination with a concave director or buffer and draw bar, or any proper substitute or substitutes therefor, the whole being applied to a car or other body, and used with a link or other equivalent.

One object of the invention apparently is to prevent the necessity for men passing between the carriages of a railway train in order to couple them together, an "eccentric hook" being connected to each draw bar of a carriage, and the arrangement being such that a link or its equivalent may be made securely to engage with the hooks by moving the carriages towards each other, each hook being provided with a ring to which a rope or chain may be connected for the purpose of raising it out of contact with the link.

[Printed, ed. Drawing. See Repertory of Arts, vol. 12 (*enlarged series*), p. 325; Artisan, vol. 7, p. 83; Patent Journal, vol. 6, p. 60; Engineers and Architects' Journal, vol. 11, p. 572.]

A.D. 1848, May 2.—No 12,143.

NORMANVILLE, WILLIAM JOHN.—"Certain improvements " in railway or other carriages, partly consisting of new modes of " constructing the axle boxes and journals of wheels, also an " improved method of lubricating the said journals or other " portions of machinery by the introduction of aqueous, alkaline, " oleagenous, or saponaceous solutions."

One of the essential features of this invention consists in rendering the axle box of a railway or other carriage "an air-tight " vessel," so as to effectually exclude therefrom dust and dirt, this being effected by the use of an elastic shield or diaphragm closely surrounding the axle outside the box, and provided with a metal shield and bolts and certain leather washers, by which its pressure against the box and axle may be regulated. This arrangement may be modified by causing the elastic shield to surround a metallic ring and press it closely round the axle, the ring being formed in several parts. In another modification the elastic shield surrounds a ring of leather, pressing it upon the axle; while in another modification the shield is interposed between the nave of the wheel and a brass washer which it presses against a plate forming the end of the axle box. The top of the latter is of circular form, having a perforated lid screwed or hinged thereon, and so enclosing the box, grease being introduced when necessary by raising the lid, the perforation being merely an " air hole."

[Printed, 16d. Drawings. See Repertory of Arts, vol. 13 (*enlarged series*), p. 73; London Journal (*Newton's*), vol. 53 (*combined series*), p. 535; Mechanics' Magazine, vol. 40, p. 453; Artisan, vol. 7, p. 20; Patent Journal, vol. 6, p. 59; Engineers' and Architects' Journal, vol. 11, p. 360 (with Disclaimer).]

A.D. 1848, June 1.—N° 12,170.

**MANSSELL, RICHARD CHRISTOPHER.**—"Certain improvements  
" in the construction of vehicles used on railways or on common  
" roads."

This invention consists in the first place in several new and improved modes of applying springs, which the patentee denominates "elongating springs," for the purpose of "supporting vehicles, and relieving concussions which occur during travelling," and also in certain means "of rendering vehicles supported on bearing or suspension springs more or less susceptible of vertical motion, or in other words easier, or more rigid, at pleasure."

Secondly, "of several improved modes of applying the before-named springs to vehicles as buffer and traction springs, for the purpose of imparting elasticity and relieving concussion when such vehicles suffer collision, and further, for relieving the jerks of an unsteady tractive power."

The essential feature of these parts of the invention consists in so applying curved springs that the action of the weight, force, concussion, or impact to which they may be subjected shall produce a "tensile strain tending to straighten the springs," the latter, when used as bearing springs, being adjustable by screws and nuts, and by moving their lower ends in some cases from hole to hole in certain "suspension irons." A great number of different modifications of these parts of the invention are described.

Thirdly, the invention consists in certain novel combinations in the construction of wheels "for use on railways or common roads, by which such wheels are rendered safer and more economical in wear than those hitherto used." The spokes are screwed at each end, and enter tapped holes in the nave at one end, and in "shoes" which sustain a wooden rim or felloe at the other. An iron tyre is then placed around the felloe, and secured thereon by turning the spokes and expanding such felloe, as well as by the application of certain flanged rings, and bolts or rivets passing through them and the felloe and shoes, or by bolts or rivets without such rings.

[Printed, 1s. 6d. Drawings. See *Mechanics' Magazine*, vol. 49, p. 571; *Practical Mechanics' Journal*, vol. 1, p. 228; *Artizan*, vol. 7, p. 105; *Patent Journal*, vol. 6, p. 85.]

A.D. 1848, June 1.—N° 12,173.

**TURTON, THOMAS BURDETT.**—"Certain improvements in  
"machinery for bending and fitting plates or bars of steel, iron,  
"and other materials, to be used for locomotive engine and car-  
"riage springs, and other purposes."

According to this invention machinery is adapted for "bending  
"or fitting plates or bars of steel or other material into the form  
"of segments by means of rollers or blocks, the said segments  
"when so shaped by the rollers or blocks being particularly  
"applicable to the making of springs for locomotive steam  
"engines and carriages."

Mounted in a suitable framework is a vertical roller, driven by gearing and certain strap pulleys so arranged that by moving the strap from one pulley to another, the roller may be driven first in one direction and then in the other, a second vertical roller being mounted near to the first, but in bearings which are moveable, and so connected with a weighted lever that the second roller is constantly pressed towards the first. Between these rollers the plate of metal to be bent is passed, and is compressed between them by the action of the weighted lever, a third roller, not in line with either of the first, being so arranged as to bend the plate into the requisite form, this roller being so mounted that its position may be varied by turning a screw, the curvature given to the plate being thus varied also. In this roller, as well as in that first mentioned, a groove is formed, these grooves being for the reception of the "nib" usually formed at the back of a spring plate. When the operation is to be performed by blocks, one large stationary block, curved to a suitable figure on its upper surface, is placed in the lower part of the machine, an upper block of corresponding figure being raised and lowered at pleasure by means of a lever and a cam, so as to press the plate between the two blocks, or release it therefrom as requisite, the lower block being grooved for the reception of the "nib" at the back of the plate.

[Printed, 10. Drawings. See Repertory of Arts, vol. 13 (*enlarged series*), p. 69; Mechanics' Magazine, vol. 40, p. 570; Practical Mechanics' Journal, vol. 1, p. 228; Artisan, vol. 7, p. 84; Patent Journal, vol. 6, p. 83; and Engineers' and Architects' Journal, vol. 12, p. 83.]

A.D. 1848, June 6.—N° 12,177.

**LATHROP, BENJAMIN.**—(*Partly a communication.*)—"An im-  
proved wheel for railway purposes."



This invention consists in "the casting of an iron wheel in one piece of such shape as shall cause the iron to remain without strain when cold." The nave is formed with a hollow space in the interior, and a hole in the centre for the axle, and the thickness of the metal is about one and a half inches. The tyre or rim of the wheel is of the usual form, and may be made with or without a flange, as required, the thickness of the tyre or rim being about one and a half or two inches. The nave and tyre or rim are connected together by a part which is equivalent to the spokes of a common wheel, and which is called the disc, this disc being about half an inch thick, and "so formed as to be corrugated on the plane of the wheel's motion, and at the same time in the line of the radii on the plane, at right angles to that plane."

Different modifications of the invention are described, in some cases curved projections extending either wholly or partially between the tyre or rim and the nave, and intersecting the disc "at right angles to the plane of the wheel's motion." The disc may be corrugated "in concentric circles," or otherwise.

[Printed, 1844. Drawing. See London Journal (*Newton's*), vol. 34 (*continued series*), p. 17; *Mechanics' Magazine*, vol. 49, pp. 363 and 373; *Practical Mechanics' Journal*, vol. 1, p. 229; *Artizan*, vol. 7, p. 105; *Patent Journal*, vol. 6, p. 95.]

A.D. 1848, June 13.—No 12,183.

MILLER, JOHN. — (*A communication.*)—"A new system of accelerated menatride locomotion, even by animal impulsion, for every species of transport machines, acting by means of wheels, whether on land or water."

This invention is described at very great length, and under various modifications, and relates not only to locomotives and carriages for railways and common roads, but also to various modes of propelling vessels on water.

One part of the invention consists in a mode of arranging wheels and axles so as to allow the wheels to rotate independently of each other, the axles being each formed in two parts, a wheel being fixed on the outer end of each, and the inner ends being connected by means of a collar, which is screwed upon one of such inner ends, while the other rotates freely therein. These are the bearing wheels of the vehicle, and the body of the latter rests upon the axles through the medium of other wheels, one of which is in each case directly over the centre of the axle, while two others called "laterals" are placed one on each side of such

axle. The two parts of the axle of each pair of bearing wheels are prevented from separating by means of discs, mounted in bearings below the body of the vehicle, and working against large collars, one of which is mounted or formed on each part of the axle. The bearing wheels are by preference formed as discs, or without spokes.

According to another part of the invention bearing wheels are formed with spokes, the section of which constitutes a triangle having two sides hollowed, and so placed that the vertex of the triangle cuts the air when the wheel is in motion. The spokes are connected to the rim of the wheel by screws formed at their outer ends, the inner end of each spoke being "like an arrow or "swallow's tail," and being inserted into a mortise in the central part of the nave or hub of the wheel, such nave or hub being composed of three portions, the central part already mentioned, and two outer or "complementary" parts, which are connected to the first by screws after the insertion of the inner ends of the spokes into the mortises thereof. The spokes are so arranged as to be nearer together at the outer than at the inner ends, and the patentee states that wheels thus formed are not only very strong, but also possess "the perfection of elasticity."

Breaks are described as consisting of blocks placed on each side of a wheel, and pressed against it by means of levers furnished with eccentrics or "ears," the levers being connected and worked by suitable mechanism.

An "impulsory" or driving or locomotive apparatus is described as consisting of framework mounted upon one bearing wheel only, such wheel being upon an axle equal in length to the breadth of the machine, the framework of the latter resting upon such axle through the medium of upper central wheels and "laterals" in the manner mentioned above, a lower central wheel, however, being in this case added in order to prevent the body of the machine from rising from the axle. This apparatus sustains an endless moveable floor, supported by polygons, and this moveable floor being put in motion by the feet of an animal or animals, causes rotation of the polygons, which in turn communicate motion to the axle of the bearing wheel through the medium of toothed gearing. This machine is attached to the carriage which is to be drawn by it by means of apparatus so jointed as to allow the machine to assume different angles with

relation to the carriage, the machine being provided with breaks similar to those mentioned above. And in front of this machine it is proposed to place a "pilot" machine, furnished with a "cutter" for dividing the air, and facilitating the progress of the locomotive and train, such a cutter being also applicable to vessels meant for water conveyance.

And as regards the latter the invention includes also a mode of propelling a vessel by means of a wheel placed at the stern, and furnished with moveable paddles, which the patentee calls "normal vogue paddles," and which are moved into different positions as the wheel rotates by means of instruments placed for the purpose. Such paddles may also be mounted upon "lateral" or side wheels," these being employed either with or without the stern wheel, and being so mounted as to be capable of turning in contrary directions, a vessel thus being capable of being steered independent of the helm; and in order to lessen the resistance of the air to the paddles they may be formed in sections or divisions, and so arranged as to be alternately expanded and closed, expanding on entering the water, and closing on leaving it. The wheels carrying the paddles may have the axles so mounted as to be capable of being raised or lowered, or the shafts of the paddles themselves may be so adjustable by means of screws that the action of the latter upon the water may be regulated according to circumstances.

The mode of propulsion mentioned above as applicable to carriages may also be applied to vessels on water, and instead of animal power steam may in both cases be substituted; and such propulsion may also be adapted to machinery in general, the arrangements of lateral and other wheels in combination with axles, mentioned above, being also applicable to shafts in general.

The invention also includes the employment of weighing machines, in order to ascertain the weight upon each wheel of a carriage, and likewise the use of an inclined plane, down which a train is "to be precipitated when it is to start."

The whole invention is described in a very cumbrous and desultory manner, the description being needlessly long and containing many useless repetitions.

[Printed, &c. &c. Drawings. See *Mechanics' Magazine*, vol. 40, p. 599  
*Practical Mechanics' Journal*, vol. 1, p. 253; and *Artizan*, vol. 7, p. 106.]

A.D. 1848, July 6.—N° 12,200.

**BRATTIE, GEORGE.**—"An improved air spring and atmospheric resisting power."

This invention consists, firstly, of "an air spring suitably arranged for closing doors and gates;" and, secondly, "of an apparatus for obtaining atmospheric resistance in the buffers of railway carriages."

One arrangement of buffer is described in which an outer cylinder contains two inner cylinders, in each of which is a piston, both pistons being connected to one rod, on which is also the buffer head. The outer cylinder is filled or nearly filled with oil, and the effect of the whole arrangement is that on the pistons being forced inwards air is condensed into one cylinder while a vacuum is formed in the other. This arrangement may be modified by placing a series of inner cylinders and pistons in line with each other, "the pistons producing a vacuum in each cylinder" on one side of such pistons, and compressing the air on the other, "the joint action of vacuum and compressing of air" being apparently considered as the leading feature of the invention. In both arrangements the inner cylinders are surrounded with oil, which not only prevents the escape of air therefrom, but also serves to lubricate the parts.

[Printed 1s. 6d. Drawings. See *Mechanics' Magazine*, vol. 50, p. 44; *Engineers' and Architects' Journal*, vol. 13, p. 295; *Practical Mechanics' Journal*, vol. 1, p. 235; *Artizan*, vol. 7, p. 132; *Patent Journal*, vol. 6, p. 143.]

A.D. 1848, July 11.—N° 12,210.

**KIRTLEY, MATTHEW.**—"Improvements in the manufacture of railway wheels."

This invention consists "of so rolling bars of iron for forming the spokes of railway wheels that the ends thereof (which come to the centre or nave) shall have angular pieces on the ends, which coming together, will produce a series of pieces, making a circle, suitable for aiding the construction of a nave," this so rolling bars as to form such angular pieces, being a substitute for the ordinary process of hammering moulds or rolling bars, and then forming such annular pieces by "hand forging." Different modes of carrying out the invention are described, in some cases bars being rolled, "which being cut across will form the angular ends to be welded on to bars suitable for making spokes."

[Printed, 6d. Drawing. See *Repertory of Arts*, vol. 13 (*enlarged series*), p. 81; *Mechanics' Magazine*, vol. 50, p. 66; *Practical Mechanics' Journal*, vol. 1, p. 277; *Artizan*, vol. 7 p. 131; *Patent Journal*, vol. 6, p. 145.]

A.D. 1848, August 7.—N° 12,231.

**THORNTON, SAMUEL, and McCONNELL, JAMES EDWARD.**  
—“Improvements in steam engines, and in the means of retard-  
“ing engines and carriages on railways, and in connecting rail-  
“way carriages or waggons together; also improvements in  
“effecting a communication between one part of a railway train  
“and another by signals or otherwise.”

The object of one part of this invention is to obviate the present dangerous mode of coupling railway carriages and waggons, whereby the men employed to do that work are constantly liable to be crushed to death or to receive serious injury when in the act of coupling them together, as this method prevents the necessity of a man going under or standing between the carriages or waggons when coupling or uncoupling them. This part of the invention consists in an arrangement of shafts provided with handles which can be turned by men standing at one side of the carriage and certain gearing actuated thereby for turning the screws of the coupling links.

Another part of the invention relates to an improved system of buffers, and consists in attaching them to or connecting them with the axles, or a frame affixed to the axles, instead of the bodies of the carriages, “by which means the buffers or the line  
“of their action will maintain one and the same height from the  
“surface of the rails to whatever amount the carriages may be  
“loaded.”

Another part of the invention relates to and consists of means of retarding engines and carriages, certain arrangements for bringing the breaks into action, by or through the system of buffers. That part of the invention “whereby the buffers or their line of  
“action are preserved at one and the same height, affords the  
“means of attaining this object, for by employing hollow buffers  
“and carrying a chain through them, every carriage throughout  
“the train may be communicated with.” This chain may be acted upon by levers or wheels, and be caused to operate upon the breaks by any convenient means.

[Printed, 3s. 2d. Drawings. See London Journal (*Newton's*), vol. 34 (*con-joined series*), p. 225; *Mechanics' Magazine*, vol. 50, p. 140; *Practical Mechanics' Journal*, vol. 1, p. 280; *Artizan*, vol. 7, p. 131; *Patent Journal*, vol. 6, p. 196; *Engineers' and Architects' Journal*, vol. 12, p. 70.]

A.D. 1848, August 21.—N° 12,249.

**SHAW, RICHARD.**—“Improvements in the manufacture of iron  
“into tyre bars, round bars, square bars, and flat bars, tee-iron,  
“angle-iron, and trough-iron.”

The object of this invention is so to arrange or construct the piles of iron from which tyre and other bars are rolled "as to prevent the iron laminating outwards," this being especially desirable in the manufacture of the tyres of railway wheels. The precise arrangement of the pile may be varied, but the main feature of the invention consists in all cases in forming one or both of the outer surfaces of the pile of bars which have been previously so bent "that the grain of the iron will not laminate outwards" when acted upon by the rolls. Thus a bar suitable for railway tyre may be composed from a pile consisting of straight bars combined with a bar which has been bent so as to resemble a trough, deeper at one side than the other, the flange of the tyre being formed from the deeper portion. Square or round bars are formed from straight, entirely surrounded by curved pieces, and "tee-bars" from a flat piece upon which is placed a piece so bent that its section resembles the letter V inverted. Other modes of arranging these piles may, however, be adopted without departing from the main feature of the invention.

[Printed, 1s. Drawing. See Repertory of Arts, vol. 13 (*enlarged series*), p. 277; London Journal (*Newton's*), vol. 34 (*conjoined series*), p. 165; Mechanics' Magazine, vol. 50, p. 189; Artizan, vol. 7, p. 185; Patent Journal, vol. 8, p. 207; Engineers' and Architects' Journal, vol. 12, p. 144.]

A.D. 1848, September 5.—N° 12,266.

SMITH, HENRY.—"Improvements in the manufacture of railway wheels."

This invention consists in "forging railway wheels in a succession of anvils, using hammers of a corresponding character with the anvils, and according to the shapes of the wheels to be produced; such wheels being solid, without spokes," and the invention being also applicable "for forging the naves and parts of the spokes of a railway wheel from a mass of iron, by using anvils and hammers with working faces to form the shape of the wheel desired."

The anvils and hammers are of various forms, and consist in reality of "forging dies or tools," which "have working faces to produce the shapes desired."

[Printed, 1s. Drawing. See Repertory of Arts, vol. 14 (*enlarged series*), p. 82; London Journal (*Newton's*), vol. 34 (*conjoined series*), p. 19; Mechanics' Magazine, vol. 50, p. 235; Artizan, vol. 7, pp. 178 and 188.]



A.D. 1848, November 16.—N° 12,327.

**BALFOUR, ALEXANDER.**—"Improvements in apparatus for cutting metal washers and other articles, and in the construction of buffers."

That part of this invention which relates to the construction of buffers embraces several particulars. In the first arrangement described the buffer head is affixed to a "stem" or rod, having at one end an enlarged part or disc to receive such head, and such stem sliding in a hollow bearing formed in a plate or casting connected to the framing of a carriage or engine, this bearing serving to prevent the buffer head from drooping or getting out of position. The outer flexible case of the buffer is composed of leather or gutta percha combined with hoops of metal, and is stuffed with Russian bristles or other suitable materials, and the plate or casting is furnished with numerous openings, apparently intended for the passage of air to and from the buffer case.

Other arrangements are described, which, although varying somewhat in detail, "depend alike on the use of blocks or sheets of compressed cork for their elasticity." In some cases these blocks or sheets are enclosed in cylinders, one of which is capable of sliding to and fro within the other, the buffer head being mounted upon a stem sliding in a bearing as mentioned above, while in other cases "the chamber containing the cork is octagonal instead of cylindrical."

Another improvement is intended to prevent "the sudden recoil of a buffer when it has been struck up with violence," and consists in furnishing the stem of the buffer with inclined notches or grooves, "which in being forced inwards expand a spring or spring surfaces, on which are corresponding notches, which, closing on the stem of the buffer head, expansion of the buffer head will be by degrees and not with suddenness."

[Printed, 3s. 4d. Drawings. See *Mechanics' Magazine*, vol. 50, p. 477 *Patent Journal*, vol. 7, p. 59.]

A.D. 1848, November 29.—N° 12,344.

**LANE, JOHN, and TAYLOR, JOHN.**—"Improvements in engines, boilers, and pumps in railway carriages; in propelling vessels, in the construction of boats, in extinguishing fire, and in brewing."



One part of this invention only requires notice here, and relates to certain arrangements whereby the action of the breaks of the wheels of railway carriages, when such breaks are acted upon simultaneously, will be rendered uniform, "although the relative position of the different carriages of a train of carriages may be constantly varying."

The breaks are described as being each composed of two parts, so formed as to embrace a boss connected to a carriage wheel, and brought into action by means of links and a short lever mounted upon an axis having connected thereto a long lever. The outer ends of each of the long levers of each carriage are brought together and so arranged as to be raised or lowered by means of a weighted cord and a sliding bar, the ends of this bar having attached thereto other cords passing round pulleys mounted on "framed levers" carried by sliding rods, one of which projects beyond each end of the carriage, the outer ends of the rods of each carriage being connected by pin joints and couplings, and the cords connected to the sliding bars of each carriage being hooked or otherwise attached together. The result of this arrangement is that the breaks may be brought into action at any time by pulling at the cords connected to the sliding bars, the arrangement of pulleys and sliding rods allowing such play of the parts as to compensate for the varying distances of the carriages.

The other parts of the invention contain nothing which requires notice here.

[Printed, 2s. 2d. Drawings. See *Mechanics' Magazine*, vol. 50, p. 536; *Patent Journal*, vol. 7, p. 107.]

A.D. 1848, December 16.—N° 12,369.

WHARTON, WILLIAM.—"Certain improvements in the construction of vehicles to be used on railways or other roads or ways."

This invention relates to the construction of wheels suitable either for railway or other carriages.

The first part of the invention consists more particularly in the employment of wedges or wedge-shaped pieces of metal in combination with and adapted to curved or bent spokes of metal, the arrangement being such that by a suitable adaptation of screws to the wedges they are made to compress the curved sides of the spokes, and so cause the outer portions thereof to be pressed forcibly against a wooden felloe and fix it firmly inside a tyre

of metal. Another arrangement is also described in which wedge-shaped pieces of metal are forced by means of screws between and against blocks of wood, forming substitutes for the spokes of a wheel, thus solidifying such wheel.

A modification of the first part of the invention is described in which the wooden felloe is dispensed with and "taper blocks" introduced between the inner ends of the curved spokes, and the outer tyres of all these wheels may either be flanged, so as to adapt them for railway purposes, or plain, so as to be suitable for common roads.

[Printed, 10*l*. Drawing. See *Mechanics' Magazine*, vol. 50, p. 389; *Patent Journal*, vol. 7, p. 170; *Engineers' and Architects' Journal*, vol. 12, p. 119.]

A.D. 1848, December 21.—N<sup>o</sup> 12,384.

**BAKER, WILLIAM, and RAMSBOTTOM, JOHN.**—"Improvements in construction of railway wheels and in railway turntables, which latter improvements are applicable to certain shafts or axles driven by steam or other motive power."

According to that part of this invention which relates to railway wheels the tyre is furnished in its inner circumference with a shallow dovetailed recess, and the spokes, of which there are two sets, are made of angle iron, and each so bent that at the outer end a portion of the spoke corresponds with the form of a portion of the inner part of the tyre, the other or inner end of the spoke being only slightly bent, and these inner ends being "cast into a nave." The tyre is shrunk upon the outer portions of the spokes, which then enter the dovetailed recess, and the spaces between these portions are then filled up by pieces "which are retained in their places by hammering up the inner edges of the angle irons, or by rivets passing through them." The two sets of spokes are further asunder near the boss of the wheel than they are near the tyre, the object of this being to "increase the lateral strength of the wheel."

The other parts of this invention do not require notice here.

[Printed, 1*l*. 6*d*. Drawings. See *Mechanics' Magazine*, vol. 50, p. 620; and *Patent Journal*, vol. 7, p. 132.]

A.D. 1849, January 5.—N<sup>o</sup> 12,404.

**HADDAN, JOHN COOPER.**—"An improvement or improvements in railway wheels."

This invention consists, firstly, "in forming the middle of the nave, or the middle of the nave and part of the spokes, or the middle of the nave and the spokes, and the rim or felloe of wheels, of bars of wrought iron, by so bending or shaping the ends intended to be nearest the centre, that when placed together the said bended or shaped ends may lap, or overlay each other, and form the middle portion of the nave, and the other portions may form parts of the spokes, or the spokes and inner rim or felloe for supporting the tyre."

Secondly, "in a mode of constructing railway wheels with tyres so formed as to enable a wheel intended to run upon an edge rail to be used upon a tram rail, by applying an outer ring or tyre fitted partly against the tread and upon the flanch of an ordinary tyre."

Thirdly, in making the treads or working surfaces of the tyres of railway wheels "of such form that in use they may bear upon the middle line and the flanch against the edge of the rail, or nearly so, and not against the hollow existing between the flange and the tread, by making the tyre of less diameter at the part immediately next the flanch than at the part which is intended to work upon the middle of the surface of the rail."

These arrangements are described at some length, and under various modifications.

[Printed, 1s. 10d. Drawings. See *Mechanics' Magazine*, vol. 51, p. 42; *Patent Journal*, vol. 7, p. 180.]

A.D. 1849, January 11.—N<sup>o</sup> 12,413.

NEWTON, WILLIAM EDWARD. — (*A communication.*) — "A certain improvement or improvements in the construction of wheels."

According to this invention a wheel is formed of "three principal pieces," these being the nave, the central part, which consists of plates of iron of a "dished" form, and the rim. In putting these pieces or parts together each side of the inner surface of the rim has a groove formed therein, and the dished plates, which have been previously cut to a circular form, and which may either be of corrugated metal or otherwise, have their outer edges inserted into these grooves. The dished form of these plates causes them to be further asunder near the centre than at the circumference, and by passing bolts through the parts near

the centre, and applying nuts thereto so as to draw the central parts of the plates towards each other, the plates being thus changed into a flatter form than before are "forced into close" contact and form a tight joint with the rim."

The precise mode of carrying the invention into effect may be varied. Thus the grooves in the rim may be of dovetail or other figure, but in the former case the rim will have to be expanded by heat in order to admit the plates. And the central parts of the plates may be drawn towards each other by bolts or screws, or by placing the plates upon the axle upon which the wheel is to work (the plates being formed with central openings to receive such axle) and compressing the plates between a collar on the axle and a "screw nut" also upon the latter. The nave of the wheel is composed of rings or collars rivetted around the central openings in the plates, inside the latter, and the plates may be further secured to the rim by bolts or rivets passed through them near their circumferences.

[Printed, *See*. Drawing. See London Journal (*Newton's*), vol. 35 (*conjoined series*), p. 47; *Mechanics' Magazine*, vol. 51, p. 44; *Patent Journal*, vol. 7, p. 152; *Engineers and Architects' Journal*, vol. 12, p. 300.]

A.D. 1849, January 11.—N<sup>o</sup> 12,414.

BLAKE, ORED.—"Certain improvements in ventilating, or " ventilators for or in ships, vehicles, houses, or other buildings."

The first part of this invention consists in a mode of forming a ventilator by the employment of two frames, one capable of sliding within the other, and each being provided with strips of glass, or of wood or metal, arranged at some distance apart, and in such manner that on moving the inner frame in one direction the strips in that frame cover the apertures between those in the other, while on moving it in the other direction such apertures are left open, thus affording means of ventilation. The inner frame is moved by means of a wedge-shaped piece which may be moved to-and-fro by hand below an inclined part formed on the lower side of such inner frame.

A modification of the invention consists in the use of a plate furnished with circular holes, covered with a perforated plate of zinc, or with wire gauze, this plate being fixed, and a moveable plate being used in combination therewith, which is provided with corresponding holes, and which may be moved to-and-fro so as to cause the holes in both plates to coincide, or so as to cause the

spaces between the holes in the moveable plate to cover the holes in the other. This arrangement may be applied to the windows or doors of houses, or to the doors or other parts of railway carriages.

According to another modification slips of glass are arranged in connection with levers combined together in the manner known as lazy-tongs, and by which they may be moved into different positions; or in place of the lazy-tongs two straight bars may be used, working in the manner of the sides of a parallel rule. In another modification, suitable for the ventilation of ships, a tube slides within a cylinder, the latter passing through a ship's side, such tube having a piece of glass at one end for the transmission of light, and beyond the glass certain oblong openings furnished with slides, the arrangement being such that in drawing the tube inwards and withdrawing the slides from the openings, air will be allowed to pass from the outside to the inside of the vessel. The openings may be covered with wire gauze, and the tube may be arranged if desirable to slide outwards instead of inwards.

Another part of the invention consists in a mode of providing for the escape of vitiated air from the interiors of railway carriages and other vehicles in which lamps are used, and which are commonly passed through holes in the roofs of such vehicles. This part of the invention is carried out by surrounding the ordinary glass shade of such a lamp by a second shade of larger size, the latter having an opening in the lower part, the space between the two shades communicating with openings in the roof of the carriage.

[Printed, *Le. Drawings.* See *Mechanics' Magazine*, vol. 51, p. 42.]

A.D. 1849, January 23.—N° 12,435.

DE BERGUE, CHARLES.—“Improvements in steam engines, “in pumps, and in springs for railway and other purposes.”

As regards springs this invention relates in the first place to a mode of constructing an “atmospheric” spring, and consists in the employment of a cylinder which is in the first place formed so as to be open at both ends, a cover being afterwards bolted to the upper end, on the under side of which is a tubular projection for the purpose of receiving a projection which rises from a piston which is inserted into the lower portion of the cylinder, the piston and cylinder being connected by means of a diaphragm composed of some flexible material which has been rendered air-tight by the

application of some suitable substance thereto, such as a solution of india-rubber. In order to prepare the spring for use the cylinder is charged with compressed air by means of a pump, such air being passed into the cylinder through an opening furnished with a valve, so arranged as to admit the passage of air into but prevent the escape of air from the cylinder.

Another part of the invention relates to "a mode of combining " a series of steel springs so as to form one compound spring " suitable for railway carriages and other purposes," and consists in the employment of plates of circular form, having inclined planes upon them, and certain springs or blades being rivetted thereto, any requisite number of such plates, with their attached springs, being placed upon a central rod, separating plates being, however, inserted between each two of the plates furnished with springs.

[Printed, 1s. 4d. Drawings. See *Mechanics' Magazine*, vol. 51, p. 72; and *Patent Journal*, vol. 7, p. 159.]

A.D. 1849, February 8.—N° 12,463.

**SLEIGH, WILLIAM WILLCOCKS.**—"A means of preventing " injuries to persons and property from the sudden stoppage of " railway carriages."

This invention consists "in the application of pressure to " either the rails on which railroad carriages move, to the periphery of the wheels of said carriages, or to both the said rails " and said peripheries, by means of what is commonly called or " known by the name of a hinge or toggle joint, acted on by a " lever of the second order, so as to diminish the velocity or " stop the motion of said carriage or carriages by a person " pressing on said lever with a force proportionate to the necessity " of the case."

One arrangement is described as being applicable to a railroad luggage van. A long lever is mounted on a fulcrum placed in bearings on the top of the van, a vertical rod being jointed at its upper end to this lever, between the fulcrum and the end, and the lower end of the rod being connected to a "toggle joint and " its arms," the ends of the latter being so formed as partly to embrace the rails when forced against them, which is effected by depressing the end of the long lever above. A "guard" is placed above the toggle joint and its arms, the ends of the arms of this guard being hinged thereto, and being outside the rails, such

ends being "moveable longitudinally," but for what purpose is not stated, the principal object of this guard apparently being to keep the arms of the toggle joint in their proper places.

Another arrangement is described in which a similar combination of parts is employed to press breaks when necessary against the wheels of carriages. The details of the invention may, however, be varied.

[Printed, 1s. 2d. Drawings. See *Mechanics' Magazine*, vol. 51, p. 141; and *Patent Journal*, vol. 7, p. 193.]

A.D. 1849, February 17.—N° 12,483.

**WHITWORTH, CHARLES FREDERICK.**—"Improvements in preventing accidents on railways."

The first part of this invention consists of arrangements whereby apparatus placed on or near a line of railway may so act, when needful, upon other apparatus carried by the locomotive engine of a train, as to sound a whistle carried thereby, and also shut off the steam from the cylinders of the engine. A lever mounted in suitable bearings on one side of a line of railway is made the means, through the medium of rods and a chain, of giving motion to signal apparatus connected to a post, and also to an axis on which are two cams, the latter, when brought into a certain position, raising two instruments, provided for the purpose, into such positions that on a locomotive passing them one of such instruments brings into action mechanism by which the whistle is sounded, while the other acts upon mechanism by which the steam is shut off from the cylinders. This mechanism consists in each case of a kind of "lock," a rod proceeding from one lock to the handle of the whistle, and another rod from the other lock to the handle of a steam cock, which being opened supplies steam to a suitable cylinder, by which a piston therein is caused to shut off the steam from the cylinders of the engine, the only difference between the two "locks" being, that the lock for cutting off the steam is provided with apparatus so contrived that if the engine driver shuts off the steam at the proper time the lock will not act; other apparatus being also provided by which a pointer will be moved over a dial each time the steam is shut off by the mechanism, and so record how often the engineer "has not done his duty and observed the signals." The details of these arrangements are somewhat complex, and will only be understood with



the aid of the drawings annexed to the Specification, the patentee, moreover, not confining himself thereto. A modification of this part of the invention is described, by which the gates of a "level crossing" cannot be opened unless apparatus adapted to shut off the steam and sound the whistle of an advancing engine is first placed in position for acting upon corresponding mechanism carried by such engine.

Another part of the invention consists in a mode of coupling railway carriages without the necessity of persons going between them. Below the framing of each carriage is a longitudinal rack, capable of being moved backwards and forwards by a pinion, and the rack of one carriage having been moved outwards, the outer end thereof, which carries a forked hook, has the axis or end of one of the links of the ordinary screw coupling placed thereon, the other link having been placed upon the draw hook of another carriage, to which the first is to be connected. The pinion is then turned so as to cause the first carriage to be drawn forward on the rack until the draw hook of that carriage receives the link which was placed on the rack, and the latter is then moved back to release it therefrom.

[Printed, 1s. 8d. Drawings. See Repertory of Arts, vol. 14 (*enlarged series*), p. 204; *Mechanics' Magazine*, vol. 51, p. 190; *Patent Journal*, vol. 7, p. 204.]

A.D. 1849, February 28.—N<sup>o</sup> 12,492.

PARSONS, PERCEVAL MOSES. — "Certain improvements in "railways, railway engines, and carriages, and certain of their "appurtenances."

One part of this invention consists in "the forming of pairs "of wheels and axles of railway engines and carriages all in one "piece, or the pairs of wheels and axles all in one piece, with the "exception of the tyres;" this part of the invention including a mode of constructing railway wheels by forming the spokes out of a flange on the inside of an inner rim, and placing outside such rim a tyre, which is secured thereto by a grooved internal flange on the latter, the inner rim fitting into such groove, and (if desirable) by bolts "passing through the rim and tyre in the "usual way."

Another part of the invention consists in forming the springs of railway engines and carriages "of one or more plates of steel "or other flexible material, the ends of which are rigidly attached

" to bearings or brackets fixed on the framing of the engines or carriages, or to the framing of the engines or carriages themselves, if of a suitable form, in such a manner that when the load or strain is applied between the two fixed ends of the springs it will cause the said springs to yield, bend, or spring at or from the points of attachment, as well as at the point where the weight or strain is applied."

Another part of the invention consists in a mode of constructing the draw bars or hooks of railway engines and carriages, in such manner that they " can be screwed in or out to any desired length by means of a lever at the ends of the carriage attached to them, or a nut into which they are screwed."

[Printed, is. 10d. Drawings. See *Mechanics' Magazine*, vol. 51, p. 311; and *Patent Journal*, vol. 7, p. 238.]

A.D. 1849, March 19.—N° 12,528.

**KNOX, GEORGE.**—"Improvements in railway carriages."

This invention consists, firstly, " of a mode of manufacturing certain descriptions of railway carriages in such manner that they may collapse, offering increased elastic resistance to a concussion, and at the same time so as to put on breaks to the wheels." The body of each carriage is divided into several portions, so mounted as to approach each other in case of collision, and, by means of springs or other suitable mechanism, to press breaks upon the wheels.

Secondly, the invention relates to buffing apparatus, in which three coiled springs are used " one within the other, which come successively into action, offering greater and greater elastic resistance." These springs are placed within a cylindrical chamber of wrought iron, within which the wrought-iron hollow stem of the buffer head slides, there being a fixed bar which prevents the spring expanding and driving out the steam too far.

Thirdly, the invention relates to a mode of constructing an elastic draught hook or link for railway carriages, in which the stem of the hook or link is furnished with a disc working in a cylinder, and provided with springs, which come into action in succession.

Fourthly, to the ventilators of railway carriages, and consists in the use of a fixed and a moveable shutter, furnished with slots, and provided with a sliding wedge and springs, which afford the

means of placing them in different positions with regard to each other.

Fifthly, to improvements in the naves of wheels of railway carriages, and consists of "forming the inner end thereof open, of a bell or conical form, by which the axles will be found to be less liable to break off at the point behind the nave."

Sixthly, to improvements in the arrangement of levers of screw couplings of railway carriages, and consists of applying three weighted arms to the screw couplings of railway carriages, and which arms are made of such a length as not to require a man to get in between the carriages to screw up the couplings.

Seventhly, to a mode of constructing railway carriages and waggons, which consists in dispensing with the use of tenons and mortices, and using in place thereof iron sockets.

[Printed, 2s. 4d. Drawings. See Repertory of Arts, vol. 14 (*enlarged series*), p. 337; Mechanics' Magazine, vol. 51, p. 286; Patent Journal, vol. 7, p. 250.]

A.D. 1849, March 28.—N° 12,539.

GREEN, CHARLES, and NEWMAN, JAMES.—"Improvements in the manufacture of railway wheels."

According to this invention, bars of iron are bent into circles and welded, and are then operated on by a succession of dies, including "bed dies," which should be securely fixed, and upper dies, which should be worked by steam in the manner of steam hammers, or by other convenient means, such as strong levers acted on by steam, or water power when the latter can be obtained. It is preferred to use a succession of dies, and to move the wheel from one to the other, in preference to moving the same bed die with the wheel to a succession of upper dies, or moving a succession of upper dies to one fixed bed die, suitable arrangements being employed for forming the peripheries as well as the central parts and naves of such wheels.

[Printed, 1s. 4d. Drawings. See Repertory of Arts, vol. 14 (*enlarged series*), p. 207; Mechanics' Magazine, vol. 51, p. 327; Practical Mechanics' Journal, vol. 2, p. 185; Engineers' and Architects' Journal, vol. 12, p. 331; Patent Journal, vol. 8, p. 4.]

A.D. 1849, April 13.—N° 12,563.

BRANDT, WILLIAM GASPARD.—"Improvements in the construction of the bearings of railway engines, and railway and other carriages now in use."

The object of this invention is to reduce the amount of friction occasioned by the revolution of the axles of railway engines and carriages, as well as of those of other vehicles, in their bearings, and for this purpose each axle box is provided with antifriction wheels or rollers, fixed upon small axes or shafts which work in bearings or bushes formed for them in the box, the peripheries of these wheels or rollers forming the bearings of the engine or carriage upon the axle, and revolving by contact with the surface of the latter. The axle boxes are provided with springs, which support the framing of the engine or carriage in the usual manner, and work within axle guards of the ordinary character, straps or bands being, however, fixed to the framing in such manner as to secure the axle box in position while allowing due movement of the frame upon the springs, and the axle runs within a slot in the axle box, the upper part of this slot being semicircular, and so contrived that if the antifriction wheels should break, it would constitute a support for the frame of the engine or carriage. The antifriction wheels are of larger diameter than the axle, this reducing the friction on their axes to a very small amount. The invention is described with reference not only to railway engines and carriages, but also to carriages and waggons for common roads, certain modifications of the invention being necessary to adapt it to the latter, and the antifriction rollers being placed within the naves of the wheels.

[Printed, &c. Drawing. See London Journal (*Newton's*), vol. 35 (*continued series*), p. 205; *Mechanics' Magazine*, vol. 51, p. 378; *Practical Mechanics' Journal*, vol. 2, p. 213; *Patent Journal*, vol. 8, p. 58.]

A.D. 1849, April 24.—N° 12,583.

KILNER, WILLIAM.—“Improvements in manufacturing railway and other axles and wheels, and in machinery to be employed in such manufacture.”

One part of this invention relates to welding the spokes to the tyre of a railway wheel. The tyre or inner hoop is bent in the usual way, and being placed on a hearth, the inner surface of such tyre or hoop is brought to a welding heat, the end of the spoke to be welded inside the same being also heated to a welding heat in a common smith's fire. When both are at a suitable temperature, the rim is brought out and turned over on a block, when the spoke is placed upon it and welded, and swaged into the desired form. The arms being all welded to the tyre, a wrought-iron

nave is next formed, and connected to both sides of the spokes at one operation, the nave being composed of two rings, which are acted upon by tools or swages of such form as to close the rings uniformly upon and between the ends of the spokes, such space having been left between, and holes having been punched, or other pieces cut out of the spokes, so as to allow the metal as soon as brought under the hammer to close up and weld through as well as with and between the ends of the said spokes. A "hollow" furnace is used by preference for heating the tyre.

The second part of the invention consists in "forming the arms of wrought iron wheels direct from the puddled or scrap bloom," which is accomplished by means of dies or swages worked under a hammer, "by taking a bloom of sufficient weight for making two or more arms at a time," certain rollers and a scraper being used in bringing the tyre into form, and this part of the invention including the rolling of the tyre during the process of shrinking on.

Another part of the invention consists in "turning and boring the outside and inner surfaces of railway tyres and wheels, when cold, by means of revolving circular cutters."

The last part of the invention relates to certain modes of constructing railway axles, one of which consists in forming an axle of an outer and an inner tube, the ends being welded together; another consisting in forming a hollow axle with the inside composed of "bars welded only at their ends," while a third mode consists in arranging bars to form an axle, "so as to give a spiral direction to the fibres of the iron."

[Printed, 1s. 10d. Drawings. See London Journal (*Newton's*), vol. 35 (*conjoined series*), p. 319; *Mechanics' Magazine*, vol. 51, p. 428; *Patent Journal*, vol. 8, p. 67; *Engineers' and Architects' Journal*, vol. 12, p. 372.]

A.D. 1849, June 14.—N<sup>o</sup> 12,661.

HENSON, HENRY HENSON.—"Certain improvements in railways and in railway carriages."

One part of this invention "has relation to the construction of the axles of railway carriages, and has for its object to diminish the frequency of fractures therein, and to facilitate the repair of such axles when they do happen to give way." A collar is raised on the axle, which may either be formed as tapering down towards the centre of the axle, or with the "thickened part" much shortened, various modifications of this part of the invention being described.

The collar may either be convex on its outer surface, or concave, but in both cases the external surface of the boss of the wheel should be turned to fit it, so that by the collar bearing upon the boss, it may give support to the axle and prevent any strain to which it may be subjected from falling with preponderant force upon the neck. And a method is shown of uniting railway carriage axles when made in two pieces. A short coupling tube is used, which is screw-threaded inside at the two ends. The two halves of the solid axle have screws cut upon them, their inner ends corresponding with those of the tube, and a disc or washer of vulcanized caoutchouc, or other like elastic substance, is used, which is interposed between the inner ends of the half axles to intercept and diminish vibration on the screwed ends of the half axles being brought into the tube. The tube is screwed round till the ends are brought into close contact with the washer, and the whole firmly combined together. The tube is kept fast in its place by means of pins or rivets, which are passed through both the axle and the coupling tube.

Another part of the invention consists in constructing railway goods carriages with wells or chambers under the ordinary line of the flooring, thus enlarging the capacity of such carriages without increasing their height.

Another part of the invention relates to the sliding covers of railway goods waggons. The new feature in this wagon consists in its being arched or curved from end to end, and opening in the middle. The part which opens is about the width of the side doors, and slides from either side of the roof, so that it may open to suit both sides of the wagon (or it may be made to open from one side only).

The invention further includes constructing the roofs of railway goods waggons of plates of corrugated iron, and in constructing the floors of covered goods waggons of iron, either plain or corrugated. And in relation to railway passenger carriages, the constructing of the under framework and body part of a combination of wood and metal plates, and the constructing of the floors and roofs of corrugated or plain metal plates, and the introduction of ventilating apertures in and near the ceiling. Also certain improvements in the construction of the wheels of railway carriages, according to which the nave is of cast iron, and is expanded radially in the form of a star, an outer tyre and an inner tyre being used, and the space between the inner tyre and the



centre part of the boss being filled up with a solid ring of some elastic substance, as vulcanized caoutchouc, cork, asphalt, or felt, or papier maché, kamptulicon, &c., and two rings, with the help of bolts and nuts, connect the boss, the solid ring, the radii, and the inner tyre all firmly together. Various modifications of this part of the invention are described.

Another part of the invention relates to improvements in the buffers of railway carriages, "which are founded on these general principles:—First, that the shock imparted by the action of the "buffer of one carriage to that of another may be better transmitted to anywhere else than to the carriage to which the "buffer belongs; and second, that the buffers of railway carriages "should therefore be separated or insulated as much as may be "from the carriages themselves." These objects are effected by mounting the buffer rods in tubes fixed under the carriages, there being between the ends of the rods a solid piece of vulcanized caoutchouc, this part of the invention also including a mode of connecting the "draw bars," by means of chains, with the buffer rods, and likewise an improved coupling chain, in which the links are composed of side pieces, joined at the ends by pins, and interlocking each other, the pins being secured by rivets or bolts if desired.

On the 26th of March 1850 the patentee enrolled a disclaimer and memorandum of alteration with reference to the Specification of this patent, by which certain verbal alterations were made in the Specification, which, however, do not require special notice here.

[Printed, 10s. 2d. Drawings. See *Mechanics' Magazine*, vol. 51, p. 577 (with Disclaimer).]

A.D. 1849, June 25.—N° 12,670.

MERCHANT, THOMAS, and HARLAND, ROBERT.—"Certain "improvements in the construction of railway carriages."

This invention consists, "firstly, of a method of connecting "together the several carriages of a railway train in such a "manner that the buffers of each of the said carriages shall be "kept in contact with the buffers of the adjoining carriage or "carriages, whether the said train be moving in a right line or "in a curve, and thereby prevent or diminish the oscillation to "which the carriages in a railway train are liable." Various modes of carrying out this part of the invention may be em-



ployed, draw bars furnished with springs being in some cases used, while in other cases such draw bars are dispensed with, and the buffers connected by "any suitable coupling."

Secondly, the invention consists of an improved break, in which two blocks of wood or other material are made to act when necessary upon each of the wheels of a truck or carriage, the novelty of this part of the invention consisting in the blocks being jointed to a bar which connects the bearings of the wheels, instead of being jointed to the framing of such truck or carriage.

Another part of the invention consists in furnishing "mercantile" carriages with lids or covers so arranged as to turn upon centres instead of "opening by hinges or sliding," this arrangement occupying less space than the ordinary covers, and being more easily accessible.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 51, p. 616; *Practical Mechanics' Journal*, vol. 3, p. 256; *Artizan*, vol. 8, p. 40; *Patent Journal*, vol. 8, p. 163.]

A.D. 1849, June 26.—N° 12,672.

**THORNEYCROFT, GEORGE BENJAMIN.**—"Improvements in "manufacturing railway tyres, axles, and other iron where great "strength and durability is required."

That part of this invention which relates to tyres is thus described:—"I make a pile of iron, the outside parts of which "consist of the toughest fibrous iron I can make, and the inner "or centre part of charcoal iron, made into one substance of an "homogeneous or solid body, perfectly free from lamina," "and "put between the slabs of the two kinds of iron thin puddled or "other bars of iron, which being of much less substance than "the slabs become sooner hot, and by the time the pile is sufficiently heated to weld sound, the thin iron in the joints passes "into a state of fusion, and causes a more perfect union of the "pile; I make this pile into a bloom either by hammering or "rolling, and afterwards I roll the bloom into the tyre edgeway, "in which it was piled or put together, thus producing a tyre "with the middle or wearing part of chrystalized homogeneous "iron, much harder and more durable than fibrous iron, and the "outer parts of the toughest fibrous iron, thereby giving greater "strength to the outer parts, and a greater degree of hardness "and durability to the inner or wearing part.

"I proceed in the same way to make a cheaper kind of tyre by "using best puddled refined No. 3 iron, made into a slab without

" piling or faggoting, therefore perfectly homogeneous, being  
 " made from one puddled ball, or two if required, but put to-  
 " gether in a maiden state before being operated upon to make  
 " them solid."

An axle is described as being formed "from a hollow pile so  
 " constructed that by the time it is rolled down to the required  
 " size it has become a solid body, but not welded in the centre;"  
 several modes of carrying out this part of the invention being  
 mentioned.

[Printed, 6d. Drawing. See Repertory of Arts, vol. 15 (*enlarged series*),  
 p. 158; London Journal (*Newton's*), vol. 36 (*combined series*), p. 105; Me-  
 chanics' Magazine, vol. 61, p. 616; Practical Mechanics' Journal, vol. 2,  
 p. 202; Artizan, vol. 8, p. 40; Patent Journal, vol. 8, p. 165.]

A.D. 1849, July 18.—No 12,713.

**BROTHERHOOD, ROWLAND.**—"An apparatus or mode for  
 " covering trucks and waggons on railways, road waggons, and  
 " canal boats, so as effectually to protect goods in the course of  
 " public transit from theft or damage, and at the same time to  
 " allow of such trucks and waggons being loaded and unloaded  
 " with equal facility."

This invention consists essentially in mounting a covering or  
 tilt upon longitudinal bearers, these being supported at the ends  
 by "radius rods," and this arrangement enabling the bearers and  
 covering to be moved towards one side or the other of the truck  
 or waggon, or drawn back again with facility, so as to again cover  
 the whole of the contents of such truck or waggon. The covering,  
 which may be of cloth, canvas, or other flexible material, is secured  
 to the longitudinal bearers by small flaps or pieces of similar  
 material which pass under the bearers, the ends of the latter being  
 suitably jointed to the upper ends of the radius rods, and these  
 may be either mounted at their lower ends on one common ful-  
 crum, or "the joint end of the centre or any other of the radius  
 " rods may be made with a branch joint on one or both sides,  
 " close to the centre or pin on which the whole is made to work."  
 The sides of the covering are also provided with longitudinal rods,  
 and various ropes, loops, and other details are introduced for the  
 purpose of facilitating the moving of the cover, and securing it in  
 any desired position. The invention is described at some length,  
 but the details thereof may be varied.

[Printed, 10d. Drawing. See Mechanics' Magazine, vol. 52, p. 59; and  
 Patent Journal, vol. 9, p. 199.]

A.D. 1849, September 20.—N° 12,779.

HANDLEY, WILLIAM, DUNCAN, GEORGE, and MCGLASHAN, ALEXANDER.—“Improvements in the construction of railway breaks.”

This invention consists “of certain means of constructing railway breaks, so that they may be caused to pass partially under the wheels of a carriage in whichever way or direction the carriage may be moving, so that the wheels will not be liable to be worn into flats at parts, nor to become heated, so as to expand the tyre by sliding along the rails.”

Various modes of carrying out the invention are described, the breaks or “skids” being mounted in connection with different arrangements of rods and levers, and brought to bear (by preference) through the medium of a “screw rod” and certain apparatus connected therewith, for which, however, other mechanism may be substituted.

[Printed, 10d. Drawing. See Repertory of Arts, vol. 15 (*enlarged series*), p. 280; *Mechanics' Magazine*, vol. 52, p. 239; *Patent Journal*, vol. 8, p. 309.]

A.D. 1849, November 2.—N° 12,828.

HAINES, MICHAEL JOHN.—“Improvements in the manufacture of bands for driving machinery, in hose or pipes, and buffers for railway purposes.”

That part of this invention which relates to buffers consists in applying between the buffer head and a plate fixed to the carriage with which the head is connected by a “screw pin,” a “series of layers of raw, dry, or buffalo hides,” these being surrounded by an outer covering of india-rubber.

[Printed, 1s. Drawings. See Repertory of Arts, vol. 15 (*enlarged series*), p. 382; *Mechanics' Magazine*, vol. 52, p. 376; *Patent Journal*, vol. 9, p. 55.]

A.D. 1849, November 10.—N° 12,839.

CHAMBERS, ENOCH.—“Improvements in the manufacture of wheels.”

Wheels constructed according to this invention “are each first made up into two halves, each half consisting of one half of the ring or felloe, one half of the spokes, and one half of the nave, all of wrought iron, and the parts of the wheels are made in

“ the following manner :—For each half of the nave a block or  
 “ plate of iron is forged in a cylindrical exterior frame, with a  
 “ flanch or projection all round, and this flanch or projection is  
 “ to be drawn out by forging so as to form projecting pieces at  
 “ those parts of the circumference where the spokes are to be  
 “ welded on,” “ each spoke having a portion of a ring or felloe  
 “ of the wheel forged thereon,” and “ the alternate portions of  
 “ the felloe or ring being on the two half naves respectively, so  
 “ that when the two are brought together and the inner surfaces  
 “ of the two half naves are brought together they will form a  
 “ wheel,” such half naves being welded together by “ a suitable  
 “ hammer or press.”

[Printed, 10d. Drawings. See Repertory of Arts, vol. 16 (*enlarged series*), p. 152; London Journal (*Newton's*), vol. 36 (*conjoined series*), p. 309; Mechanics' Magazine, vol. 52, p. 395; Engineers' and Architects' Journal, vol. 13, p. 200; Patent Journal, vol. 9, p. 95.]

A.D. 1849, November 24.—N° 12,862.

BARRANS, JOSEPH.—“ Improvements in axles and axle boxes  
 “ of locomotive engines and other railway carriages.”

This invention consists in “ employing wedges or filling pieces  
 “ in such manner that as the brasses or bearings of the axles  
 “ wear the axles may be prevented from endway motion by reason  
 “ of the ends or other parts of the axles being stopped by  
 “ filling pieces or surfaces capable of adjustment from time to  
 “ time.”

Various modes of carrying out the invention are described, the details including a small box or drawer so placed under the axle box as to catch the grease which runs therefrom, and so prevent such grease from being wasted.

[Printed, 3s. 8d. Drawings. See London Journal (*Newton's*), vol. 34 (*conjoined series*), p. 97; Mechanics' Magazine, vol. 52, p. 433; Artizan, vol. 9, p. 154, and vol. 9, p. 155; Patent Journal, vol. 9, p. 103.]

A.D. 1849, December 3.—N° 12,874.

PARADIS, JOSEPH.—(*A communication*).—“ Improvements in  
 “ the manufacture of elastic mattresses, cushions, and paddings,  
 “ part of which improvements is applicable to other purposes  
 “ where sudden or continuous pressure is required to be sustained  
 “ or transmitted.”

This invention consists in the employment of a spring of peculiar construction for forming the internal part of a mattress,

cushion, or pad, and thereby imparting to such mattress or other article a sufficient degree of elasticity, but at the same time rendering the article lighter than when stuffed in the ordinary manner.

The spring consists of a single piece of iron wire, the ends of which are inserted into holes made in the ends of a cylindrical wooden or metal roller, round which the central part of the wire is coiled or wound to form a helical or coiled spring. The ends of the wire, although inserted into holes at each end of the roller, are not fixed therein, but are allowed a proper amount of play. "When pressure is applied to either or both ends of the spring the ends will be found to approach each other, and the coiled part of the spring will be forced outwards," "and will thereby be caused to unwind in both directions, during which operation a great amount of resistance will be offered by the elasticity of the spring. In applying these springs to mattresses, couches, cushions, and such like articles, it will be found advisable to arrange the springs in pairs, that is, in such a manner that the two single springs which constitute the pair may, when pressed upon, act or bend out in opposite directions," and such springs may be variously combined and used both as the buffer springs and bearing springs of railway carriages, several modes of applying them thereto being described, to which modes, however, the patentee does not confine himself.

[Printed, 10d. Drawing. See Repertory of Arts, vol. 17 (*enlarged series*), p. 85; London Journal (*Newton's*), vol. 37 (*conjoined series*), p. 89; Mechanics' Magazine, vol. 62, p. 469; Patent Journal, vol. 9, p. 115.]

A.D. 1849, December 3.—N° 12,876.

DE STRUBING, BARON JAMES ULRIC VAUCHER.—"Improvements in the manufacture of axletree boxes for carriages, and of the bearings of the axles of railways, and in the making of an alloy of metal suitable for such and the like purposes."

The first part of this invention consists in lining axletree boxes "by pouring in proper soft metal," which is retained in place by its also filling certain holes with which the box is provided, a groove or recess being formed within the box for the reception of lubricating matter by a fillet or ribbon of some thin fabric being folded round the axletree, which "prevents the box being lined at that part."

Another part of the invention consists in forming axle bearings of "soft metal," combined with a "shell" in such manner that

when the soft metal becomes worn such metal may be easily replaced.

The third part of the invention consists of "an alloy of metal," suitable for either the purposes of this invention or other uses, this alloy being composed of a mixture of zinc, tin, lead, and antimony.

[Printed, 1s. Drawing. See Repertory of Arts, vol. 16 (*enlarged series*), p. 16; London Journal (*Newton's*), vol. 37 (*conjoined series*), p. 36; Mechanics' Magazine, vol. 53, p. 453; Patent Journal, vol. 9, p. 102.]

A.D. 1849, December 3.—No 12,877. (\* \*)

DONISTHORPE, GEORGE EDMOND. — "Improvements in "wheels of locomotive carriages." "Constructing the driving "wheels of locomotive engines in such manner that the running "surfaces thereof shall consist each of several separate and independent parts, pressed outwards by elastic means, whereby a "larger portion of the driving wheel will be constantly in contact "with a rail, and thus may the driving wheels of locomotive "engines be made more effective." The running surface of the wheel is composed of a series of sliding blocks, placed side by side in a deep groove around the tire, and pressed outwards by a belt of vulcanized india-rubber; each block being kept in its proper position by a bolt extending through the tire and through a slot in the block.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 16 (*enlarged series*), p. 146; London Journal (*Newton's*), vol. 36 (*conjoined series*), p. 357; Mechanics' Magazine, vol. 52, p. 433; and Patent Journal, vol. 9, p. 104.]

A.D. 1849, December 5.—No 12,878.

FISHER, SAMUEL. — "Improvements in railway carriage wheels, "axles, buffer, and draw springs, and hinges for railway carriage "and other doors."

The first part of this invention relates to improvements in the manufacture of railway carriage wheels, and consists of a cast-iron wheel, having wrought-iron spokes enclosed within the casting. Spokes of wrought iron are formed into "elbow bends," and constitute together a fellow or ring of wrought iron as well as spokes, such wrought-iron spokes and fellow being "laid into an "iron mould, prepared for making a cast wheel," the cast iron being run into such mould, and the wheel being thereby formed.

Secondly, to improvements in railway axles. The axle is made in two parts, one part passing into and revolving within the other, and in order to retain the two parts together collars are used; which are retained in their places by set screws; each of the collars being composed of two half-rings, and such collars filling grooves round part of the axle.

Thirdly, to improvements in railway buffer and draw springs, which consist of applying springs of wood for such purposes in place of steel.

Fourthly, to improvements in hinges for railway carriage and other doors, such hinges being composed of india-rubber shut in between two plates, both in fixing them to the door and also to the door post. The mode of fixing such hinges, however, may be varied.

[Printed, 16d. Drawings. See Repertory of Arts, vol. 18 (*entire series*), p. 15; Mechanics' Magazine, vol. 54, p. 477; Patent Journal, vol. 9, p. 118.]

A.D. 1849, December 10.—N<sup>o</sup> 12,883.

CHRISTIE, JOHN STOUGHTON.—(*A communication.*)—"An improved construction of wrought-iron wheels, and machinery for effecting the same."

The object of this invention is to form wrought-iron wheels which may be suitable not only for railway purposes, but for use on common roads, and it consists, firstly, in fastening the various parts necessary to form the wheel temporarily together, and then raising the whole to a welding heat, and welding them together in a mould, and secondly, in certain machinery and apparatus suitable for the purpose of the invention.

To form the nave or hub of the wheel certain pieces are employed which have been cut from bars, the section of which is an isosceles triangle, these pieces forming in fact wedges, which are in the first place arranged with the points inwards around a temporary axle. A tyre of proper size is then formed by bending a flat bar of iron into the form of a circle and welding the ends together, and this tyre is then placed concentric with the hub or nave, and spokes, also cut from flat bars, are then inserted so as to extend from the inside of the tyre to the temporary hub, the inner ends of these spokes being introduced between the wedge shaped pieces already mentioned, and the other ends of the spokes being so bent as to lie for some distance parallel and in contact



with the tyre, to which they are united by small rivets, or by any other convenient means, the parts forming the hub or nave being also temporarily secured by hoops or rings placed upon their ends. These parts are now ready for welding together, and this is effected by placing the whole in a cylindrical box of metal, the bottom of which forms a die corresponding with the intended shape of one side of the finished wheel, there being placed between the spokes certain blocks, arranged in pairs, and these blocks being acted upon by wedges connected to the lower face of a heavy ram or hammer, which on being let fall drives the wedges between the blocks, and by forcing them "outward from each other with a steady horizontal movement," effects the welding of the different parts of the wheel together, the lower face of this ram also forming a die by which the upper side of the wheel is shaped. The blocks have fins projecting from their lower sides, which pass down through slots in the bottom of the mould, and serve not only to guide the blocks, but to furnish means of moving them when necessary, and through the centre of the mould is a circular hole for the passage of a mandril suitable for finishing the eye or bore of the hub or nave of the wheel. This mandril may be attached to the ram, "yet loosely, so as to detach itself after the first blow." These arrangements are suitable for producing a wheel without a flanged tyre, and in order to produce such a tyre (which is to be afterwards placed on the wheel) a mould is used of suitable form in which the pieces of metal which are to compose the tyre are placed in a heated state, and then operated upon by blocks arranged around the inner circumference of such metal, and driven outwards by wedges carried by a hammer or ram, and which on falling are driven down between the back portions of the blocks and a certain projection rising in the middle of the mould, and furnished with "facets" opposite the blocks. The ram may be formed in one piece or block, or it may consist of two parts, one being placed above the other, and the lower part carrying the wedges, this allowing the upper portion to strike upon the lower without the wedges being withdrawn from the blocks. Each pair of blocks is kept together by springs when not acted upon by the wedges, and in forming a tyre the tread and flange may be faced with steel, if desirable, by placing a layer of steel outside a layer or layers of iron and welding the whole together.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 52, p. 493; and *Patent Journal*, vol. 9, p. 113.]

A.D. 1850, January 11.—N° 12,924.

COOPER, ALFRED.—“Improvements in steam and other power engines, and in the application thereof to motive purposes; also in the method of and machinery for arresting or checking the progress of locomotive engines and other carriages.”

The only part of this invention which requires notice here consists of a mode of working a break in which three levers are mounted on fulcrum placed in a horizontal line with each other, and so connected that by moving the first, through the medium of a handle, the second and third are also moved so as to press a break connected to the latter with great force upon the “top” of a carriage wheel.

[Printed, 1s. Drawings. See *Mechanics' Magazine*, vol. 53, p. 58; *Patent Journal*, vol. 9, p. 186.]

A.D. 1850, January 11.—N° 12,925.

MCDONALD, JAMES.—“Certain improvements in the mode of applying oil or grease to wheels and axles and to machinery, and in connecting the springs of wheel carriages with the axles or axle boxes.”

The first part of this invention relates to lubricating the journals or bearing surfaces of railway carriages, and waggons, with oil or “liquid” grease in a more efficient and economical manner than heretofore, this being effected by the employment of an air-tight oil box, containing arrangements for supplying the oil or grease in an uniform manner, such box at the same time preventing the access of dust to the axle box. The oil box rests upon or forms a portion of the upper part of the axle box, and there are openings in the bottom of the oil box which communicate with corresponding openings in the brass bearing which rests upon the axle, there being placed in the openings in the bottom of the oil box (which have nipples projecting below them) wicks of cotton or other suitable material, these being so arranged as to allow a certain limited quantity of oil or grease to pass constantly to the axle. In the top of the oil box is an opening through which oil or grease can be introduced, and this opening is furnished with an air-tight cover, which is kept closed by a spring or other suitable means, except when it is requisite to supply the box with the lubricating material.

The access of dust to the axle box is further prevented by the brass step as well as the axle box itself, being made to overlap the

inside shoulder of the axle, and extend to the nave of the wheel, the lower part of the box being provided with packing, both step and box being provided, moreover, if desirable, with rings projecting into grooves in the nave, or the shoulder of the axle may carry rings projecting into grooves in the axle box. The lower part of the latter is provided with an opening, fitted with a screw which may be withdrawn for the escape of surplus oil or grease.

The second part of the invention relates to a mode of connecting the bearing springs with the axle boxes of railway carriages and waggons, and consists "in adapting a ball or spherical bearing point and surface between the under part of the spring and the upper part of the axle box, in such manner that the spring, with the carriage attached, and the axle box with the axle attached thereto, may have a certain amount of free motion, or of motion independent of each other," the strain to which these parts, as ordinarily constructed, are subjected, being thereby diminished.

The invention is described and claimed solely with reference to railway vehicles.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 37 (*continued series*), p. 88; *Mechanics' Magazine*, vol. 63, pp. 60 and 70; and *Patent Journal*, vol. 9, p. 177.]

A.D. 1850, January 29.—N<sup>o</sup> 12,953.

COLEGRAVE, FRANCIS EDWARD.—"Improvements in saddles, parts of which improvements are also applicable to the standing rigging and other furniture of ships or vessels, and to the connecting links or chains of railway carriages, and other purposes where tension combined with a certain degree of elasticity are required."

One part of this invention relates "to the construction and employment of an arrangement of springs adapted to the connecting links or draw-bars or chains of railway carriages." According to one modification of the invention, the frame of a railway carriage, horse-box, or truck is divided into three compartments by cross beams or bars; draw-bars with hooks at the outer ends are attached at their inner ends to two strong metal forks, and the prongs of these forks are connected to cross bars, the inner ends of the buffer rods being inserted into the ends of these bars, and coiled springs being placed between the two bars. The result is that the sudden jerk which is occasioned by the train being put in motion will be received by the bars and springs, the latter being compressed "by the draw-bars being drawn out."

The buffers, moreover, "do not require any other spring for their action than those just spoken of in the frame for the draw-bar, as they equally press against the bars."

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 37 (*conjoined series*), p. 76; *Mechanics' Magazine*, vol. 53, p. 99; *Patent Journal*, vol. 9, p. 224.]

A.D. 1850, April 15.—N° 13,043.

DE BERGUE, CHARLES. — "Certain improvements in locomotive and other steam engines, also in buffers for railway purposes."

That part of this invention which relates to buffers, "consists in a peculiar mode of constructing station buffers," whereby the resistance offered to the train of carriages is produced "by the friction of a beam or beams of timber, which move between two surfaces, one or both of which is made to give way under the force of the blow." An arrangement is described in which the buffer beams are "somewhat taper," and when struck are driven between two surfaces of cast iron, the upper surface composing the lower side of a plate, which, being moveable, is made to compress certain india-rubber rings, the latter thus forming an elastic medium of resistance to the action of the buffer. This part of the invention also includes "making the cylinder and piston part of vulcanized india-rubber buffers," such as described in the Specification of a former Patent granted to the present patentee, in such manner that a wooden block, when the buffer is driven up, comes into contact with the outer end of the cylinder, "in place of two metallic surfaces coming together," as set forth in that Specification.

[Printed, 1s. 4d. Drawings. See *Mechanics' Magazine*, vol. 53, p. 317; *Patent Journal*, vol. 10, p. 31.]

A.D. 1850, April 18.—N° 13,045.

BUCKWELL, WILLIAM, and FISHER, GEORGE. — "Improvements in the construction and means of applying carriage and certain other springs."

The first part of this invention consists in so constructing springs that "the tensile strength or application of metal is brought into action in giving elasticity or pliability," and in the application of such springs "to act against the force or load in the direction of their tensile strength." This part of the

invention is described at some length, but consists in reality in constructing a spring in the form of an "oval or ellipsis," composed of steel, and thickening gradually from the sides to the ends either by the metal itself being thicker in proportion, or by the introduction of suitably formed plates. Such a spring may be used as the bearing spring for a carriage or truck, being placed with the longer axis of the oval or ellipsis in a vertical line, and the spring, when acted upon, having the sides bent outwards, the main feature of this part of the invention apparently consisting in causing the spring to assume a greater curvature of form when loaded than when unloaded, whereas in springs generally used for bearing springs the reverse is the case. An arrangement is shown in one of the drawings annexed to the Specification which is obviously meant for application to a railway waggon.

The second part of the invention consists in causing railway buffer and traction springs "to act in buffing and traction in the same and one central line of the load or force on the springs in the tensile direction of their strength," instead of the traction spring acting by a "central tension" and the buffer springs at the sides of the vehicle, the main object of this part of the invention apparently being to facilitate the passing of a train along curves, whether in drawing or "while thrusting or shunting." This part of the invention is also illustrated by a drawing annexed to the Specification, in which springs are represented as being applied to buffer and traction purposes, which are made according to the first part of the invention.

The patentees mention various advantages as arising from the arrangements set forth.

[Printed, 1s. 4d. Drawings. See Repertory of Arts, vol. 16 (*enlarged series*), p. 332; *Mechanics' Magazine*, vol. 53, p. 334; and *Patent Journal*, vol. 10, p. 43.]

A.D. 1850, May 7.—N° 13,073.

ROBBINS, GEORGE.—"Improvements in the construction of railway carriages."

This invention "refers to improvements upon those parts of such carriages as serve to retard and stop the progress of a train, the object being to brake all the carriages of a train simultaneously at the pleasure of the engine driver or guard, and it consists in a system of self-acting brakes, which are brought into operation upon the running wheels by the inward

" movement of the buffer rods, and also an arrangement of  
 " apparatus for preventing the action of the brakes when the  
 " train is being backed, and the motive power is necessarily  
 " applied to the carriages through the buffers instead of through  
 " the draw bars and chains." The inner ends of the draw rods  
 are respectively furnished with straps, each of which embraces  
 and supports a buffer spring composed of two parts. The ends  
 of these springs ride upon shoes attached to the ends of the  
 buffer rods. The buffer springs are divided into two parts, and  
 at the back of each is a tumbling piece which is brought to bear  
 against it when the brakes are not required to act, these tumbling  
 pieces then causing the springs to offer an unusual amount of  
 resistance to the movement of the buffers, but such tumbling pieces  
 being moved out the way of the springs at other times, and so  
 permitting the buffers full play, when through the medium of  
 other springs they will press the brakes against the wheels, the  
 tumbling pieces being made to change their position at pleasure  
 by the tightening or slackening of a chain. Different modifi-  
 cations of the invention are described, in some cases the tumbling  
 pieces acting directly against the buffer rods, and the brakes  
 themselves being variously arranged.

[Printed, 1s. 4d. Drawings. See London Journal (*Newton's*), vol. 37 (*con-joined series*), p. 398; *Mechanics' Magazine*, vol. 53, p. 398; *Patent Journal*, vol. 10, p. 79.]

A.D. 1850, May 28.—N<sup>o</sup> 13,084.

NEWTON, ALFRED VINCENT.—(*A communication.*)—" Improve-  
 " ments in couplings for carriages, and in the attachment of wheels  
 " to axles."

The first part of this invention consists of "a 'fifth wheel,' for  
 " coupling the fore axle and the perch of a carriage, and it is also  
 " adapted to connecting the trucks of railway carriages with the  
 " body of the same, as well as to various purposes of the like  
 " nature," this fifth wheel consisting in reality of two circular  
 plates so formed that by one movement they can be interlocked  
 or combined, and so form a union which enables the "king bolt"  
 to be dispensed with.

Another part of the invention relates to "a mode of connecting  
 " those parts of the wheels of all vehicles used for locomotion  
 " which encounter or receive the shocks in moving onward with  
 " those parts which play upon the axles. These connections are



"so made as materially to arrest all shocks received by the wheel  
 "at the circumference before they reach the axle," such effect  
 being obtained "by interposing between the nave and rim of the  
 "wheel some permanently elastic substance, as india-rubber or  
 "compounds of like character, or elliptical, spiral, or corrugated  
 "springs of steel," these being placed within the hub of the  
 wheel.

The rest of this invention relates solely to carriages for common  
 roads, and will be noticed in another series of Abridgments.

[Printed, 8d. Drawing. See London Journal (*Newton's*), vol. 38 (*con-  
 joined series*), p. 335; *Mechanics' Magazine*, vol. 53, p. 456; *Patent  
 Journal*, vol. 10, p. 118.]

A.D. 1850, June 5.—No 13,102.

**SHARPE, EDMUND.**—"Certain improvements in railway car-  
 "riages."

This invention consists, "firstly, of a novel arrangement of and  
 "method of constructing the framework of railway carriages,  
 "such arrangement being more especially adapted to that class  
 "of railway carriages for the accommodation and conveyance of  
 "passengers and goods, the frames of which are lower or closer  
 "to the ground than is commonly the case." Two outer longi-  
 tudinal beams form the "sole" or support of the carriage body,  
 these being connected to the buffer beams, and combined with  
 other parallel beams called "guard pieces," and certain cross and  
 diagonal beams. The under rails of the carriage rest upon the  
 soles, and are secured likewise to the guard pieces and cross beams,  
 the guard plates of the axle boxes being also secured to the guard  
 pieces, and the result of the whole arrangement being that a car-  
 riage of great strength is produced which is at the same time of  
 "greater extent in width than usual," and therefore capable of  
 accommodating a larger number of passengers.

Secondly, "of a novel design for a buffing apparatus, including  
 "several modifications thereof as applied to low carriages, such  
 "buffing apparatus being so arranged and constructed as to  
 "obviate the inconvenience and danger likely to arise from the  
 "centre of the buffer rods and buffer heads of high and low car-  
 "riages not coinciding when such carriages are intermixed in one  
 "and the same train." The buffer head is of elongated or ellip-  
 tical form instead of being circular, and is in some cases connected  
 to two buffer rods attached to the upper and lower portions of the



head; while in other cases it is connected to a forked rod to which a single buffer rod is united by a link.

[Printed, 1s. 8d. Drawings. See *Patent Journal*, vol. 10, p. 280; *Mechanics' Magazine*, vol. 55, p. 494.]

A.D. 1850, June 11.—N° 13,123.

**ELLIS, SAMUEL.**—"Improvements in machinery or apparatus applicable to all kinds of carriages used on railways."

This invention consists "in arranging and adapting machinery or apparatus in and to carriages on railways, in such manner as that the carriage may be made to travel sideways, and transferred from one line of rails to any other adjoining line, whenever a transverse railway of suitable gauge has been made to intersect and unite the two first-mentioned lines at right angles."

This is effected by applying to each carriage certain wheels, in addition to the ordinary bearing wheels, the additional wheels being placed at right angles with the latter, and being mounted in bearings so contrived that by turning a handle in connection with a rack and pinion, "or other well-known agent," the carriage is made to rest upon the additional wheels, and be traversed thereon from one line of rails to another.

[Printed, 10s. Drawing. See *Mechanics' Magazine*, vol. 53, p. 494; *Patent Journal*, vol. 10, p. 128.]

A.D. 1850, July 3.—N° 13,162.

**HADDAN, JOHN COOPER.**—"Improvements in the construction of carriages and wheels, and in brickwork."

This invention embraces a multitude of particulars. The first part of the invention relates to railway carriages, the under frames of which are constructed wholly or principally of metal, and consists in constructing the sides and ends of such frames of bars or plates, having their ends so bent that when placed together the bends may lap round, over, or against each other, "and be connected together so as that the corners of the carriage shall be double or of two thicknesses of metal;" and also "in constructing the transverse and diagonal ties of such under frames with bars having their ends bent so as to hold the sides and ends together."

Another improvement in the construction of carriages consists

in forming the framing of the sides and ends of the bodies of such carriages "with diagonal bracing or struts, flush with the other " timbers or pieces of the framing."

Another improvement consists in constructing the sides and ends of railway carriages by "attaching the material employed as " the exterior covering against and upon the framing of the said " sides and ends, the said framing being constructed so that the " exterior faces of its several posts, battens, rails, struts, or other " timbers or pieces shall lie flush with each other, or in one and " the same plane or curve; or the upper and lower portions in " separate planes or curves, in order that the covering may be so " placed against and fixed upon them."

The second part of the invention relates to the construction of wheels, and consists,—

Firstly, of an improvement in such wheels as are formed of wrought-iron bars, bent into a triangular or segmental form, the ends of which make up the middle portion of the nave, the " length of contact of the two ends of each bar " being here increased " for such a length that when the segments are placed " together those parts (of the bars) which are not in contact are " less liable to injury by the welding on the cheek pieces, and " also torsion is more effectually resisted."

Secondly, of an improvement in wheels formed of bars and filling up pieces, the bars and filling up pieces being so disposed " that not only those parts of the bars which are in contact with " the filling-up pieces are protected, but the parts of the bars " which are not in contact either with each other or the filling-up " pieces shall be at such a distance from the centre of the wheel " that the said parts will be less liable to injury by the welding " on the cheek pieces."

Thirdly, in welding the two ends of the same bar to one nave piece, and so proportioning such nave piece that the ends of the bars will not be injured by the welding up of such nave piece, or by being welded to cheek pieces.

Fourthly, in constructing cheek pieces "by so bending or setting a bar at its middle flatways, and then bending the ends in " opposite directions edgewise into a circular form as to constitute " a double hoop with parallel sides."

Fifthly, in constructing the spokes and felloes of railway wheels by welding the ends of a bar bent into a triangular or segmental

form to one end of a straight bar, or by bending and welding up into a triangular or segmental form one end of a bar, while the remainder is left straight.

Sixthly, in so disposing the spokes, or some of the spokes, of single spoked wheels, when tangentially placed with regard to a circle concentric with the wheel, that half the number so placed may lie in an opposite tangential direction to the other half.

Seventhly, in disposing bars bent into a segmental or triangular form with spaces between such segments, and welding or fitting intermediate lengths of felloe or T spokes into such spaces to complete the felloe.

Eighthly, in fitting together the felloe portions of L and T spokes, in wheels furnished therewith, "by inclined planes at their junctions with each other or with segmental spokes."

Ninthly, in constructing wheels, having bended bars of segmental form, with wedges of wood between them, in such manner that the wedges "have their wide ends nearest to the nave, and their narrow ends nearest to the felloe."

Tenthly, in shaping the ends of bars suitably for forming the middle portion of the nave of railway wheels, after the bars have been bent, into a segmental or triangular form.

Eleventhly, in securing tyres to the bodies of railway wheels by means of rivets or bolts passing obliquely through the tyre from the back or under the flange, and so as not to pass through the tread or working face of the tyre.

Twelfthly, in casting tyres for railway wheels with flanges projecting inwards on one of the sides, for the purpose of connecting the tyres with the skeletons or frames of the wheels.

Thirteenthly, in casting tyres for railway wheels around and so as to enclose a hoop, ring, band, or strap of wrought iron, for the purpose of preventing accidents, in the event of the tyre breaking.

These particulars are all set forth in detail and at some length. And the invention also includes certain improvements in brick-work, but these will be noticed in another series of Abridgments.

[Printed, 4s. 6d. Drawings. See *Mechanics' Magazine*, vol. 54, p. 39; *Engineers and Architects' Journal*, vol. 14, p. 64; and *Patent Journal*, vol. 10, p. 189.]

A.D. 1850, July 17.—N° 13,179.

MELVILLE, JOHN.—"Certain improvements in the construction of railways and locomotive engines and carriages."

One part of this invention consists in coating the peripheries of the driving wheels of locomotives with a thin stratum or film of viscous or adhesive substance capable of being readily renewed, in whole or in part, with or without some gritty or earthy material applied to the surface of such substance, the wheels being thus caused to bite the rails more strongly.

Another part of the invention consists in the application of woollen or coir, or other suitable fibrous fabric, or cork or india-rubber, to the periphery of the wheels of railway carriages, between the felloe and the tire, in order to diminish the effects of concussion and vibration.

Another part of the invention relates to a mode of constructing buffers, in which two sets of circular steel springs "are placed" alternately one within the other, so as to stand in two planes at "right angles," being mounted in cross grooves formed of a cylinder of wood, the buffer head being connected to a second short cylinder sliding over the first, and furnished with a transverse bar which acts upon the springs. A similar arrangement of springs is described as forming a bearing spring, and another arrangement in which a spiral coil of coir fabric is crossed by an elastic band, or encompassed by a single coil of "spring steel," the central aperture being, if desirable, filled with vulcanized caoutchouc.

Another part of the invention consists of an improved connecting link, so formed as to support the carriage in the event of a wheel or axle breaking, the main feature of this link being composed of a sort of piston connected to one carriage passing into and sliding within a cylinder or tube attached to the next.

The invention also includes an arrangement of rail breaks, connected to parallel bars, and brought into action when necessary by means of a screw and a crank connected therewith by a certain link; a somewhat similar arrangement being described as applicable to skids or shoes, by which, if desirable, the wheels of a carriage may be "borne off the rails."

[Printed, 10*d*. Drawings. See *Mechanics' Magazine*, vol. 54, p. 95; *Engineers' and Architects' Journal*, vol. 14, p. 33; *Patent Journal*, vol. 10, p. 191.]

A.D. 1850, October 3.—N° 13,269.

AMBERGER, JEAN PIERRE PAUL.—"Certain improvements" in the application of magnetic power for moving and stopping

"carriages, for giving adherence to wheels upon rails, and also  
"for transmitting motion."

This invention relates, first, "to certain improvements in the  
"application of motive power for stopping railway carriages,"  
and consists in the first place in fixing to the engine, or one of  
the carriages of a train "electro-brakes," the poles of which  
either rest on the rails "or are kept above them," these brakes  
being composed of rectangular masses of iron enclosed in a  
covering of copper, and furnished with wires for conducting to  
them a current of electro-magnetism. In one of the arrange-  
ments described, the brakes are kept above and clear of the rails  
by levers, which are moved so as to lower them upon the rails  
when they are to be used, the electro-magnetic current being then  
applied to cause pressure of the brakes downwards against such  
rails. In another arrangement the brakes are so mounted that  
the electro-magnetic current when applied causes the descent and  
pressure of the brakes upon the rails.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 54, p. 298; *Practical  
Mechanics' Journal*, vol. 4, p. 37; *Engineers' and Architects' Journal*,  
vol. 14, p. 225; *Patent Journal*, vol. 11, p. 15.]

A.D. 1850, October 4.—N° 13,272.

BERNARD, JULIAN.—"Improvements in pneumatic springs,  
"buffers, pumps, and stuffing boxes."

This invention "relates to the application of a flexible tube or  
"tubes, in the construction or formation of springs, buffers,  
"pumps, stuffing boxes, and other mechanism whereby such  
"mechanism or apparatus is made more effective in its action,  
"and generally more economical in first cost, than by the existing  
"modes of construction." The chief feature of the improve-  
ments "consists in the adaptation of such flexible tubes, so that  
"one or both ends of the tube shall fold inside or outside the  
"remaining length of tube in such a manner as to give peculiar  
"facilities for the expansion or contraction of the space inclosed  
"by the tube, when used as a transmitting cylinder, or for other  
"purposes."

Various applications of the invention are described. In the  
formation of a buffer one end of a flexible tube is connected to a  
plate forming the end or bottom of a cylinder which is attached  
to the "buffer beam," and within which cylinder is placed a sort  
of piston to the rod of which the buffer head is attached, this

piston, however, not touching the inside of the cylinder, but being connected to the other end of the flexible tube (which is inside the cylinder) in such manner that on pressing the buffer head inwards the end of the tube connected to the piston is forced backwards inside such tube, one portion of the latter being thus folded or turned inside the rest, the air inside the tube being thus compressed, and serving as a spring or cushion to the buffer. Suitable arrangements for guiding the piston in its movements and for the admission and discharge of air from the tube are provided, and a certain quantity of liquid is placed in the latter, sufficient to prevent the piston from being made to strike the end of the cylinder. The invention may be applied to "hydrostatic" presses as well as to the other purposes named.

[Printed, *8d.* Drawing. See London Journal (*Newton's*), vol. 38 (*conjoined series*), p. 363; *Mechanics' Magazine*, vol. 54, p. 298; *Engineers' and Architects' Journal*, vol. 14, p. 224; *Practical Mechanics' Journal*, vol. 4, p. 35; *Patent Journal*, vol. 11, p. 40.]

A.D. 1851, January 23.—N<sup>o</sup> 13,473.

**BUNNETT, JOSEPH.**—"Certain improvements in public carriages for the conveyance of passengers."

One part of this invention consists "in a mode of compensating for the wear and preventing or lessening lateral motion in the axle bearings of railway carriage wheels," this being effected "by means of a wedge interposed between them and acted upon by a screw or other mechanical power." The arrangements described relate in the first place to bearings which are composed of leather, bearings so composed forming another part of the invention, and being applicable alike to railway and other carriages. Such bearings are formed of a series of pieces of leather arranged side by side, and connected together by sewing or riveting these pieces encircling the upper part of the axle, while other leathers are placed below the axle to confine the grease and keep the axle steady in its bearings, suitable openings being left for the passage of grease to the axle from the grease box. The wedge which is to compensate for the wear of these bearings is placed with the point upwards between two plates of metal, the sides of which next the wedge are inclined to correspond therewith, while the other sides are vertical, both plates and wedge being placed about midway of the pieces of leather forming the bearing, and the wedge being drawn upwards by means of a screw (or other suitable arrangement) so as to gradually force asunder

the plates and so cause them to press the leather towards the shoulders of the axle. A similar arrangement may, however, be applied to the bearings of axles when such bearings are formed of metal, the axle bearings in this case being composed of two parts, and a wedge being forced between these parts as the bearings become worn.

The invention includes not only the application of leather for the bearing parts of the axle boxes of railway and other carriage wheels as mentioned above, but also a mode "of providing additional and easily accessible seats for outside passengers on omnibuses (without elevating them above the roof) by slightly recessing or cutting into the sides and roof of the vehicle," guards or partitions being also employed "for dividing the seats of omnibuses, and separating the passengers from each other."

[Printed, 1s. 2d. Drawings. See *Mechanics' Magazine*, vol. 35, p. 99, and *Patent Journal*, vol. 11, p. 210.]

A.D. 1851, February 5.—N° 13492.

PERKINS, ANGIER MARCH.—"Improvements in railway axles and boxes."

This invention consists in obtaining "a long bearing for the axle," and according to one mode of carrying out the invention a cylinder is made, "say of the following dimensions, 5½th inches in external diameter, and 4½ internal diameter, 5 feet 8 inches long. This cylinder is lined with a compound metal, which melts at about four hundred and fifty or five hundred degrees of temperature, such as is now usually employed for railway boxes. The lining is accomplished in the following manner:—A nearly cylindrical bar of cast iron, of three and a half inches diameter, is prepared by turning it very smoothly, about one-eighth of an inch larger at one end than the other. This is placed in the centre of the hollow axle by means of two caps made to fit the outside of the axle, which leaves a space seven-sixteenths of an inch wide between the two cylinders. When this is ready it is all heated to a temperature of five hundred or six hundred degrees, and the metal is poured in through a hole in the cap until it flows out of another hole in the other cap. It is then left to cool, and when it is sufficiently set the cylinder is hoisted and allowed to fall on the smaller end of the cylinder or mandril two or three times, when it will come out and leave a perfectly smooth and nearly a cylindrical lining to the axle. Upon this axle the



“ wheels may be fixed in the usual way; then through this axle  
 “ is passed a square bar of wrought iron, with the four edges  
 “ rounded off so as to leave them about one inch wide all along  
 “ the square bar; when finished, this square bar will nearly fill  
 “ the inside of the axle cylinder. On the ends of the square bar  
 “ with rounded edges are placed two boxes suitable for supporting  
 “ the carriage in the usual way, and at the same time to make a  
 “ close joint against the end of the hollow axle. It may be neces-  
 “ sary to place between the boxes and axles a thin leather washer  
 “ to ensure a more perfect joint. In order to retain the oil or  
 “ grease effectually, and to prevent the entrance of dust, a leather  
 “ band will be necessary round the joint; this can be secured by  
 “ a band of india-rubber or other suitable means.”

Another mode of carrying out the invention consists in fixing  
 the wheels upon the inner axle, as usual, the carriage resting  
 upon the outer cylinder, in which case the axle “ would be cylin-  
 “ drical instead of square, and would revolve against the upper  
 “ portion of the inner lining of the outer cylinder.”

[Printed, 8d. Drawing. See Repertory of Arts, vol. 18 (*enlarged series*),  
 p. 141; *Mechanics' Magazine*, vol. 55, p. 136; *Patent Journal*, vol. 11,  
 p. 333.]

A.D. 1851, February 11.—N° 13,506.

HEYWOOD, BENJAMIN.—“ Certain improvements in railway  
 “ and other carriages.”

This invention consists, firstly, “ in so constructing the sliding  
 “ windows of railway and other carriages that the wooden framing  
 “ which usually surrounds the glass is entirely dispensed with,  
 “ and the window is formed of a plate of glass, the edges of  
 “ which are suitably rounded,” so as not to cut the lining in  
 which it moves.

Secondly, “ in lining the grooves of carriage windows with  
 “ vulcanized india-rubber, leather, velvet, or other suitable mate-  
 “ rial, instead of covering the edges of the window frame with  
 “ the same;” and,

Thirdly, “ in securing the glass string or strap by which the  
 “ sliding window is raised or lowered to carriage windows made  
 “ entirely of glass,” either by means of clips having screws which  
 pass through holes in the glass and furnished with tubes around  
 which the string is sewn, or by means of plates between which  
 and the glass the string is pressed by screws which also pass  
 through the glass, a lining of some soft substance being inter-

posed between the plates and the glass in order to prevent the latter from being fractured in tightening the screws.

[Printed, 6d. Drawing. See *Mechanics' Magazine*, vol. 55, p. 156; *Patent Journal*, vol. 11, p. 244.]

A.D. 1851, March 10.—No 13,546.

**JOWETT, HENRY ALFRED.**—"Certain improvements in railway breaks and carriages."

According to this invention a piston is mounted in a cylinder placed horizontally below the body of a railway van or other vehicle, the rod of this piston being connected with break apparatus of the ordinary character, and the arrangement being such that on the piston being pressed outwards, or from the bottom of the cylinder, the breaks will be pressed against the wheels of the vehicle. The piston is operated upon, in order to effect this when necessary, by hydraulic pressure, a passage from the bottom of the cylinder leading to a second cylinder, smaller than the first, placed in a vertical position, and furnished with a plunger, a supply of water being conveyed to this cylinder by any convenient means. By depressing this plunger the water is made to drive the piston in the first-named cylinder forward, and so apply the breaks to the wheels. The depression of the plunger is effected by means of a lever handle, and this lever may then be secured in position so as to keep the breaks in contact with the wheels by the use of a bolt or other suitable contrivance. And in order to provide the means of exercising great pressure upon the breaks in case of emergency, the plunger already mentioned has in its upper part a cylindrical recess, in which is a second and smaller plunger, this being operated by a second lever handle, water being placed in the recess, and the action of this second plunger (which takes place after the depression of the first) increasing the pressure of the breaks upon the wheels.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 55, p. 254; and *Patent Journal*, vol. 11, p. 290.]

A.D. 1851, April 24.—No 13,598.

**ANDREWS, WILLIAM.**—"Certain improvements in steam engines, and in boilers, in pumps, in safety valves, and in wheels and axles."

That part of this invention which relates to the construction of railway wheels consists of welding a surface of iron on to the outer

circumference of the wheel, "the grain of which iron shall run in  
 " a direction so as to cross the rails on which it is moving in  
 " a transverse direction," a "better holding or friction" being  
 thus obtained than when "the grain of the iron of the periphery  
 " of the wheel is in a direction around the periphery, and in a  
 " line with the rails on which it runs."

That part of the invention which relates to railway axles consists "of welding on the ends of the axletrees a coating of iron,  
 " the grain of which runs around the axle, by which they will be  
 " less liable to heat than when the grain of the iron runs in a  
 " direction lengthways of the axletrees."

[Printed, 3s. 6d. Drawings. See *Mechanics' Magazine*, vol. 55, p. 356;  
*Patent Journal*, vol. 12, p. 47.]

A.D. 1851, April 26.—No 13,603.

HADDAN, JOHN COOPE.—"Improvements in the permanent  
 " way of railways, in railway and other carriages, and in the  
 " manufacture of papier maché to be used in making carriages  
 " and other articles."

That part of this invention which relates to railway carriages  
 " consists in constructing their sides and ends or other portions  
 " by combining or cementing together pieces of any suitable com-  
 " position or material, squeezed, pressed, or otherwise moulded,  
 " shaped, or formed, so that the said pieces may constitute  
 " framing and covering, or framing and lining, or framing, cover-  
 " ing, and lining."

The improvement in the manufacture of papier maché consists  
 in "sticking together or combining" layers of paper or other  
 material so as to form among other articles "panels to be used in  
 "making carriages," pressure and heat being both employed in  
 the operation.

The other parts of the invention do not require notice here.

[Printed, 1s. 6d. Drawings. See *Mechanics' Magazine*, vol. 55, p. 377;  
*Patent Journal*, vol. 12, p. 60.]

A.D. 1851, April 26.—No 13,606.

WRAGG, JONATHAN.—"Improvements in railway and other  
 " carriages."

This invention consists, firstly, in "so constructing railway  
 " carriages, railway trucks, and other carriages used on railways  
 " where buffing apparatus is employed, that breaks may be

"brought into action in order to retard such carriages when the "buffing apparatus thereof are pressed back," the buffer rods being furnished with projections so arranged as to act upon levers and press breaks connected thereto upon the rails when the buffers are forced inwards; or, if preferred, the breaks may be made to act upon the wheels of the carriage or truck, springs being so placed as to keep the breaks out of contact with the rails (or wheels) when the buffers are not so pressed inwards.

The second part of the invention consists of improvements in axles used in railway and other carriages. The patentee states that it has been usual for the most part "to employ wrought iron "or steel, or the two metals combined, forged into the desired "shape," but that according to this part of his invention "they "are to be cast in metal capable of being rendered malleable by "annealing."

[Printed, 8d. Drawing. See Repertory of Arts, vol. 18 (*enlarged series*), p. 360; London Journal (*Newton's*), vol. 48 (*conjoined series*), p. 10; Mechanics' Magazine, vol. 55, p. 376; Patent Journal, vol. 12, p. 59.]

A.D. 1851, May 3.—N° 13,618.

SMITH, WILLIAM.—"Improvements in locomotive and other "engines and in carriages used on railways."

Although "carriages used on railways" are included in the title of this patent, the specification does not describe any improvement in such carriages, but is limited to improvements in steam carriages, pumps, and signal apparatus to be applied to railway carriages.

[Printed, 1s. 2d. Drawings.]

A.D. 1851, May 29.—N° 13,649.

WILKINS, WILLIAM CRANE.—(*A communication.*)—"Certain "improvements in railway buffers."

This invention consists in the employment of buffers, the cases or cushions of which are filled with sand or silica, the patentee stating that sand or silica, "unlike the ordinary substance used "in buffers, does not possess the property of resistance, but, on "the contrary, is of such a nature as to absorb (so to speak) the "blow or force of the shock produced by the concussion of one "carriage running violently against another." The sand or silica preferred for the purpose "is the ordinary sand of the sea "shore," this "being more uniform in its granulation than any

"other sand. The sand used should be perfectly dry, as any moisture would materially detract from its efficacy as an absorbent of the force resulting from concussion."

Buffers thus constructed are not meant to supersede the ordinary buffers, but to be so arranged as only to come into operation in case those buffers are acted upon to an unusual degree.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 40 (*conjoined series*), p. 103; *Mechanics' Magazine*, vol. 55, p. 459.]

A.D. 1851, June 3.—No 13,653.

ADAMS, WILLIAM BRIDGES.—"Certain improvements in the construction of roads and ways for the transit of passengers, of materials, and of goods; also in buildings and in bridges, and in locomotive engines and carriages; parts of which improvements are applicable to other like purposes."

That part of this invention which relates to the subject of the present series of Abridgments embraces, — the coupling together two or more four or six-wheeled carriages or engines by buffer rods or dowel rods passing from one carriage frame or engine frame into the other, for the purpose of keeping them at one horizontal level, and giving vertical support. Also the application to railway carriages or waggons of double headstocks and rigid truss frames, for the purpose of preventing damage by buffing and traction. Also the application of screw bolts to connect the parts of iron under frames of railway carriages together, to give facility of separation in case of repairs, or for facility of transport to render them conveniently portable. Also the construction and application of triangular iron for the sole bars and headstocks of waggons and carriages. Also the construction and combination of the "registered" coal hopper waggon of the patentee "to form double wagons." Also the construction of railway carriage wheels with the "ribbed tyres," formerly patented by the present patentee, and "with single disk plates and false rib or double disk plates combined with central cast or wrought-iron cheek plates" all rivetted or bolted together, without piercing holes in the "tread of the tyre." Also the application of angle iron, riveted to an ordinary rail tyre to produce a rib to which to rivet the disk or disks. Also the application of radial flat spokes in such wheels instead of the disks. Also the application of tin or other metal as a covering to the separate plates of steel which form laminated springs for carriages on railways, so that they may be hermetically

sealed from rust. Also the application to railway carriages and locomotive engines of improved sledge brakes, either hinged to the axle boxes or made to slide on bars inclining to the rails, so that the motion of a screw or other means may cause them to impinge on the rails, and so that the same sledges will serve as safety bearers on the rails in case of the breakage of a wheel or axle. Also the application of "water-tank wagons," to water railways, and prevent their being damaged and causing dust and wear. Also the application of moveable buffer heads to the ends of carriages and engines, so that the carriages may be worked either in pairs or separately.

These particulars are set forth at great length and under various modifications.

[Printed, 3s. 2d. Drawings. See *Mechanics' Magazine*, vol. 45, p. 176; *Practical Mechanics' Journal*, vol. 4, p. 226, and vol. 5, p. 65; *Patent Journal*, vol. 12, p. 133.]

A.D. 1851, June 17.—N° 13,669.

HEPBURN, FRANCIS JOHN SWAINE.—"Improvements in the manufacture of carriages and other vehicles."

This invention relates to ventilating carriages and other vehicles, by constructing them with a second or interior roof or lining in addition to an ordinary or other exterior roof, the said interior roof or lining being composed of perforated metal, cloth, or some other substance or material permeable to air, or having apertures therein, and the chamber or chambers between the roofs having apertures in its sides, or being otherwise constructed to communicate with the external atmosphere."

An application of the invention to a first-class railway carriage is described, in which an interior roof of perforated zinc, covered with cloth, is fixed against the under side of the "hoopsticks" which support the external roof, a series of chambers being thus formed, all of which communicate at each end with the external atmosphere, but are provided with valves which may be opened or closed at pleasure. In order to give as much head room as possible opposite the doors of the carriage the interior roof need not be applied at the portions so opposite, and, in that case, if the ventilation should be insufficient the middle hoopsticks of each compartment of the carriage may be constructed of two strips of iron with blocks of wood placed between them, a perforated sliding plate being used to open or close the passages between the blocks.



An application of the invention to a carriage of the description known as a "Clarence" is also set forth, but the essential features of this arrangement are the same as those already mentioned, the patentee stating that the invention may in like manner be applied to a passenger canal boat, an omnibus, a palanquin, or any other description of enclosed vehicle.

[Printed, 1s. 2d. Drawings. See *Mechanics' Magazine*, vol. 55, p. 401; and *Artizan*, vol. 10, p. 37.]

A.D. 1851, July 22.—N° 13,697.

VARLEY, SAMUEL.—"Improvements in retarding and stopping " railway carriages, and in making communications between the " guards and engine drivers of railways."

[No Specification enrolled.]

A.D. 1851, July 31.—N° 13,705.

COWPER, CHARLES.—(*A communication.*)—"Improvements in " locomotive engines, and boilers, and carriages, part of which " improvements are applicable to other similar purposes."

One part of this invention relates to the axle guards and bearings of railway carriages and engines. An axle guard is made of elastic plates of steel, fixed to the framing and carrying the guides between which works the axle box. The grooves in the axle box which receive the plates are wider at the ends than in the middle, so as to allow of the bending of the plates. "By this means a " degree of lateral elasticity is afforded so as to diminish the " concussions produced by the lateral oscillations of the carriages." Various modifications of this part of the invention are described.

The invention further includes, constructing the axle boxes and bearings of locomotive engines and carriages so that they may bear on the collars at the ends of the axle, as well as upon the ordinary bearing surface or journal; also a mode or modes of making the axle boxes and bearings so that they may bear against the end of the axle and also against the nave of the wheel. Also a mode or modes of fitting one wheel of a pair of wheels of a railway carriage loose upon the axle, and securing it by a ring and a shoulder, or by two rings, while the other wheel is fixed upon the axle in the ordinary manner. Also a mode or modes of constructing a brake with a block or shoe without flanges, which is capable of being brought down quickly upon the rail by means of a grooved disc or cam, or a pinion and racks, and then



forcibly pressed down by means of a screw, with the intervention of a spring to prevent concussion.

Also a mode or modes of constructing the wheels of locomotive engines and carriages with tyres of a conical form, having an inclination to the horizontal line of not less than one part in four, and with or without flanges. Also the application of wheels with conical tyres so that some of the wheels of a locomotive engine or carriage may have their tyres inclined in the contrary direction to those of the other wheels. Also constructing the wheels of locomotive engines and carriages with grooves in their tyres of such form that the sloping sides of the groove may bear upon the rail while the deepest part of the groove is out of contact with the rail. Also constructing the axle box and crank boss of the driving wheels of engines with external cranks, so that the axle box may bear partially upon the boss of the crank, and the combination of this arrangement with dished driving wheels. Also constructing springs for engines and carriages in such manner that the weight shall come upon the plates successively instead of simultaneously; the lower being in some cases thicker than the upper plates. Also a mode of jointing the fore carriage or boggy frame of an engine or carriage by means of two pins, working in transverse and longitudinal slots in the frame. Also a mode or modes of roofing over the tender and part of the engine, to protect the driver and the coke from the weather. And also a mode or modes of applying, on the driving axle of an engine, one fixed and one loose wheel, in order to facilitate the passage round curves, as likewise the application of two or more such pairs of wheels to the same engine, coupled together to act as driving wheels.

[Printed, 6s. 6d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 136; and *Engineers' and Architects' Journal*, vol. 15, p. 73.]

A.D. 1851, August 5.—N<sup>o</sup> 13,710.

BISSELL, LEVI.—“Certain new and useful improvements in  
“ the means of sustaining travelling carriages and other vehicles,  
“ which improvements are applicable to other like purposes.”

This invention “refers to a novel construction of springs, applicable to carriages used on railways and other roads, and also  
“ to a variety of useful purposes where elastic resistance is  
“ required.” These springs may be made of any wood fit for the purpose, dressed to a proper size, and of such a taper towards

each end that when pressed upon they will yield as required. Along the whole length of the spring, saw cuts are made, from about half an inch to two inches apart, according to the quality of spring required. These cuts are made only so far through the wood as may be needful to adapt the material to the intended use, and they are filled with strips of metal, wood, or other hard substance when a rigid spring is required, or with some elastic substance for a more yielding spring. These strips of filling substance are forced sufficiently tight into the saw cuts to make the spring retain its required curve when sustaining the desired load. In some cases, where a great weight is to be borne, rivets are passed through each block thus formed in order to prevent the blocks "from splitting off from the main body of the spring," and to prevent the strips or filling pieces from dropping or working out the ends of the rivets may extend over the inserted piece. When the spring is required to sustain a very heavy pressure it may be necessary to strengthen it by bolting a plate of steel or other metal of the length of the spring on the concave side thereof, and instead of filling in the saw cuts, "a plate of metal may be made in the shape of the required spring, and blocks of wood, with the ends setting close against each other, may be bolted on, and thereby the same effect will be produced."

[Printed, &c. Drawing. See London Journal (Newton's), vol. 41 (conjoined series), p. 31; Mechanics' Magazine, vol. 56, p. 156; Artizan, vol. 10, p. 65.]

A.D. 1851, August 28.—N° 13,729.

**McCONNELL, JAMES EDWARD.**—"Certain improvements in locomotive steam engines and railway axles, parts of which are applicable to stationary and marine steam engines."

One part of this invention consists in "applying wrought iron metal tubular framing to locomotive steam engines," such tubular framing being made either of wrought iron or steel, "or of wrought iron and converted into steel while in the tubular form," the object being to "get greater strength with less dead weight of material" in the framing of such engines.

Another part of the invention consists in the "steeling of the journals of railway axles," and also "the manufacture of hollow axles from lap-jointed tubes," welded by means of rollers and "shaping plates." Hollow axles can thus be produced of "greater uniformity and density of structure throughout" than can be obtained by the ordinary modes of manufacture.

The invention also includes the manufacture of hollow axles "of increased thickness at certain parts from lap-welded tubes," this being effected by drawing "thickening pieces" upon a tube, and welding or contracting them thereon by convenient means; and another part of the invention consists in the manufacture of "a solid iron axle incased with steel," this being accomplished by drawing a tube of steel upon an iron axle, and then welding or contracting it upon such axle. The invention also includes a variety of particulars which do not require notice here.

On the 24th of May, 1858, the patentee enrolled a Disclaimer, with reference to certain parts of the invention for which this Patent was granted, but this Disclaimer has no relation to any of the particulars mentioned above.

[Printed, 4s. 4d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 196; and *Practical Mechanic's Journal*, vol. 6, p. 23.]

A.D. 1851, October 2.—N° 13,760.

WARREN, JAMES.—"Improvements applicable to railways and railway carriages, and improvements in paving."

One part of this invention relates to an "improved locking buffer," in which one part of the buffer, which is intended to grasp the counterpart, is furnished with springs, or with a "cup" of india-rubber, "thereby greatly reducing the oscillation without interfering with the elasticity of the junction."

Another part of the invention consists of a sledge, van, or carriage, the lower part of which can be brought in contact with the rails by means of a screw or other suitable machinery within reach of the breaksman, and which it is believed will form a very efficient and powerful brake.

Another part of the invention consists in a self-acting break for carriages, "having for its object the prevention or retarding of a retrograde motion in the ascent of an incline. The break is attached to the back of the carriage, and is hinged or jointed to the frame. The novelty of this invention consists in the application of this break to railway carriages, but the form of the break is not new."

Another part of the invention consists of an improved railway sledge break, "having for its object the gradual stopping of a train in motion." The first carriage is received on to the sledge break, and the impetus carries the sledges and carriage along the rails, at the same time winding up a chain connected to counter-

each end that when pressed upon they will yield as required. Along the whole length of the spring, saw cuts are made, from about half an inch to two inches apart, according to the quality of spring required. These cuts are made only so far through the wood as may be needful to adapt the material to the intended use, and they are filled with strips of metal, wood, or other hard substance when a rigid spring is required, or with some elastic substance for a more yielding spring. These strips of filling substance are forced sufficiently tight into the saw cuts to make the spring retain its required curve when sustaining the desired load. In some cases, where a great weight is to be borne, rivets are passed through each block thus formed in order to prevent the blocks "from splitting off from the main body of the spring," and to prevent the strips or filling pieces from dropping or working out the ends of the rivets may extend over the inserted piece. When the spring is required to sustain a very heavy pressure it may be necessary to strengthen it by bolting a plate of steel or other metal of the length of the spring on the concave side thereof, and instead of filling in the saw cuts, "a plate of metal may be made in the shape of the required spring, and blocks of wood, with the ends setting close against each other, may be bolted on, and thereby the same effect will be produced."

[Printed, *Ed. Drawing*. See *London Journal (Newton's)*, vol. 41 (*continued series*), p. 51; *Mechanics' Magazine*, vol. 56, p. 156; *Artizan*, vol. 10, p. 63.]

A.D. 1851, August 28.—N<sup>o</sup> 13,729.

**MCCONNELL, JAMES EDWARD.**—"Certain improvements in locomotive steam engines and railway axles, parts of which are applicable to stationary and marine steam engines."

One part of this invention consists in "applying wrought iron metal tubular framing to locomotive steam engines," such tubular framing being made either of wrought iron or steel, "or of wrought iron and converted into steel while in the tubular form," the object being to "get greater strength with less dead weight of material" in the framing of such engines.

Another part of the invention consists in the "steeling of the journals of railway axles," and also "the manufacture of hollow axles from lap-jointed tubes," welded by means of rollers and "shaping plates." Hollow axles can thus be produced "greater uniformity and density of structure throughout" can be obtained by the ordinary modes of manufacture.

forcibly pressed down by means of a screw, with the intervention of a spring to prevent concussion.

Also a mode or modes of constructing the wheels of locomotive engines and carriages with tyres of a conical form, having an inclination to the horizontal line of not less than one part in four, and with or without flanges. Also the application of wheels with conical tyres so that some of the wheels of a locomotive engine or carriage may have their tyres inclined in the contrary direction to those of the other wheels. Also constructing the wheels of locomotive engines and carriages with grooves in their tyres of such form that the sloping sides of the groove may bear upon the rail while the deepest part of the groove is out of contact with the rail. Also constructing the axle box and crank boss of the driving wheels of engines with external cranks, so that the axle box may bear partially upon the boss of the crank, and the combination of this arrangement with dished driving wheels. Also constructing springs for engines and carriages in such manner that the weight shall come upon the plates successively instead of simultaneously; the lower being in some cases thicker than the upper plates. Also a mode of jointing the fore carriage or boggy frame of an engine or carriage by means of two pins, working in transverse and longitudinal slots in the frame. Also a mode or modes of roofing over the tender and part of the engine, to protect the driver and the coke from the weather. And also a mode or modes of applying, on the driving axle of an engine, one fixed and one loose wheel, in order to facilitate the passage round curves, as likewise the application of two or more such pairs of wheels to the same engine, coupled together to act as driving wheels.

[Printed, 6s. 6d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 136; and *Engineers' and Architects' Journal*, vol. 15, p. 73.]

A.D. 1851, August 5.—N<sup>o</sup> 13,710.

BISSELL, LEVI.—“Certain new and useful improvements in  
“the means of sustaining travelling carriages and other vehicles,  
“which improvements are applicable to other like purposes.”

This invention “refers to a novel construction of springs, applicable to carriages used on railways and other roads, and also to a variety of useful purposes where elastic resistance is required.” These springs may be made of any wood fit for the purpose, dressed to a proper size, and of such a taper towards



each end that when pressed upon they will yield as required. Along the whole length of the spring, saw cuts are made, from about half an inch to two inches apart, according to the quality of spring required. These cuts are made only so far through the wood as may be needful to adapt the material to the intended use, and they are filled with strips of metal, wood, or other hard substance when a rigid spring is required, or with some elastic substance for a more yielding spring. These strips of filling substance are forced sufficiently tight into the saw cuts to make the spring retain its required curve when sustaining the desired load. In some cases, where a great weight is to be borne, rivets are passed through each block thus formed in order to prevent the blocks "from splitting off from the main body of the spring," and to prevent the strips or filling pieces from dropping or working out the ends of the rivets may extend over the inserted piece. When the spring is required to sustain a very heavy pressure it may be necessary to strengthen it by bolting a plate of steel or other metal of the length of the spring on the concave side thereof, and instead of filling in the saw cuts, "a plate of metal may be made in the shape of the required spring, and blocks of wood, with the ends setting close against each other, may be bolted on, and thereby the same effect will be produced."

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 11 (*conjoined series*), p. 31; *Mechanics' Magazine*, vol. 56, p. 150; *Artizan*, vol. 10, p. 65.]

A.D. 1851, August 28.—N<sup>o</sup> 13,729.

McCONNELL, JAMES EDWARD.—"Certain improvements in locomotive steam engines and railway axles, parts of which are applicable to stationary and marine steam engines."

One part of this invention consists in "applying wrought iron metal tubular framing to locomotive steam engines," such tubular framing being made either of wrought iron or steel, "or of wrought iron and converted into steel while in the tubular form," the object being to "get greater strength with less dead weight of material" in the framing of such engines.

Another part of the invention consists in the "steeling of the journals of railway axles," and also "the manufacture of hollow axles from lap-jointed tubes," welded by means of rollers and "shaping plates." Hollow axles can thus be produced of "greater uniformity and density of structure throughout" than can be obtained by the ordinary modes of manufacture.

The invention also includes the manufacture of hollow axles "of increased thickness at certain parts from lap-welded tubes," this being effected by drawing "thickening pieces" upon a tube, and welding or contracting them thereon by convenient means; and another part of the invention consists in the manufacture of "a solid iron axle incased with steel," this being accomplished by drawing a tube of steel upon an iron axle, and then welding or contracting it upon such axle. The invention also includes a variety of particulars which do not require notice here.

On the 24th of May, 1858, the patentee enrolled a Disclaimer, with reference to certain parts of the invention for which this Patent was granted, but this Disclaimer has no relation to any of the particulars mentioned above.

[Printed, &c. &c. Drawings. See *Mechanics Magazine*, vol. 55, p. 196; and *Practical Mechanic's Journal*, vol. 6, p. 23.]

A.D. 1851, October 2.—N<sup>o</sup> 13,760.

WARREN, JAMES.—"Improvements applicable to railways and railway carriages, and improvements in paving."

One part of this invention relates to an "improved locking buffer," in which one part of the buffer, which is intended to grasp the counterpart, is furnished with springs, or with a "cup" of india-rubber, "thereby greatly reducing the oscillation without interfering with the elasticity of the junction."

Another part of the invention consists of a sledge, van, or carriage, the lower part of which can be brought in contact with the rails by means of a screw or other suitable machinery within reach of the breakman, and which it is believed will form a very efficient and powerful brake.

Another part of the invention consists in a self-acting break for carriages, "having for its object the prevention or retarding of a retrograde motion in the ascent of an incline. The break is attached to the back of the carriage, and is hinged or jointed to the frame. The novelty of this invention consists in the application of this break to railway carriages, but the form of the break is not new."

Another part of the invention consists of an improved railway sledge brake, "having for its object the gradual stopping of a train in motion." The first carriage is received on to the sledge brake, and the impetus carries the sledges and carriage along the rails, at the same time winding up a chain connected to counter-



weights, first on the small part of a barrel, and then gradually on to a larger part, by which means the carriages are gradually brought to a state of rest. A pall, acting on a ratchet wheel, prevents the return of the counterweights.

[Printed, 3s. 2d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 296.]

A.D. 1851, October 22.—N° 13,782.

**BEATTIE, JOSEPH.** — "Improvements in the construction of " railways, in locomotive engines and other carriages to be used " thereon, and in the machinery by which some of the improve- " ments are effected."

That portion of this invention which relates to the subject of the present series of Abridgments consists, firstly, in constructing axles of a number of wrought-iron tubes shrunk one over another, a shaft or mandril being then introduced, and the journals formed and the axle afterwards rolled, and the mandril being left therein if desired, or a mandril being used at each end of the axle to strengthen such ends; strengthening tubes or shields being also applied, and such tubes or shields being also applicable to ordinary axles.

Secondly, in placing at the end of an axle a small friction wheel, and causing this to give motion to a roller carrying flannel, sponge, or some other soft substance, for the purpose of conveying lubricating matter from a cistern to the journal of the axle. Instead of this arrangement a flange or "oil lifter" is fastened to the end of the axle; or cotton wicks may be pressed against the axle by springs, and raise the oil by capillary attraction.

Thirdly, in improvements in the wooden wheel for which a patent was granted to the present patentee in the year 1840, the wooden segmental pieces used therein being here divided, and hoop iron introduced into the joints. The central portion of the wheel is composed of a wrought-iron tube, furnished with a collar to which the flanges of the nave are bolted, and the tyre has a dovetailed lip or flange which embraces the ring or felloe of the wheel, this being formed to correspond therewith, and dovetailed "clips" being also used in securing the whole together.

Another improvement relates to connecting and coupling carriages together, and consists in surrounding the buffer heads while in contact, with a case or receiver, by which the carriages are kept together in the event of the breakage of the coupling chains, wheels, or axles.

Another part of these improvements relates to the manufacture of tyre, and consists in welding together bent bars of iron, or iron and steel, so as to constitute a partly formed hoop, which is then welded or rolled "into a suitable section," and made into a finished tyre. Scrap iron placed in angle iron which is bent into hoops may also be welded together, and tyres formed from such hoops; and the ends of tyre bars may be connected by cutting slots or dovetail grooves in such ends and inserting therein loose pieces of metal, which, with the ends of the bars, being heated, are then operated upon by a new arrangement of steam hammers, "working vertically and horizontally, or in the ordinary way." Or the ends of the bars "may be dovetailed only, without the introduction of loose pieces." The different parts of the invention are described at great length, and under a great variety of modifications.

[Printed, 5s. 2d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 387; and *Engineers' and Architects' Journal*, vol. 15, p. 194.]

A.D. 1851, October 23.—N° 13,789.

POOLE, Moses.—(*A communication*).—"Improvements in axle boxes for railway carriages."

This invention consists, firstly, "in applying to or combining with the box and axle a stuffing box so disposed as to effectually prevent the admission of dirt or dust into the box or between it and the axle;" and, secondly, "in so constructing the composition bearing of the box, and other parts connected with it, as to readily admit of the removal of said bearing at any time after it may have become heated or injured," the composition bearing being supported upon a "slide plate" which is capable of removal, along with the bearing, through an opening in the front of the "enclosing case." A mode is also described of fixing in place the leather washers usually employed to prevent the access of dust to axle boxes, each washer being forced into a recess formed "in one solid piece with the box" by doubling or contracting and springing such washer into such recess; the ordinary cap plate and confining screws being dispensed with. And a method of constructing axle boxes and cases is also set forth in which the case is supported upon the upper bearing by certain projections, the top plate of the case and the cap or side piece being in one piece, separate from the rest of the case, and held in place by recesses and projections or other analogous con-

trivances, the use of screws or screws and nuts for holding the parts together being thus rendered unnecessary. The details of the invention are very fully set forth.

[Printed, 12. Drawings. See *Repertory of Arts*, vol. 39 (*enlarged series*), p. 89; *Mechanics' Magazine*, vol. 56, p. 79.]

A.D. 1851, November 4.—N° 13,797.

**VIGURS, HENRY.**—"Improvements in buffers, grease boxes, " axle boxes, and springs, and in appendages to railway engines " and carriages."

One part of this invention relates to buffers, and consists in making the buffer rods to abut against the opposite extremities of two cross levers, connected with a powerful coiled spring, the inner end of which is made fast to one of these levers, which turns upon a central axis in plates or bearings affixed to the framing of the carriage, while the outer end of the spring is bolted to the other lever, the arrangement being such that on the buffers being acted upon the levers "are turned so as to tighten the coil of the " spring."

Another part of the invention relates to grease boxes and axle boxes, and consists in interposing a strip of sponge, or a wad of tow, cotton, or other similar material, between a recess or groove, in a hinged covering plate, and a channel along which the grease passes to the bearing. By this means the supply of grease to the axle is moderated and filtered so as to keep back all impurities; this part of the invention including the use of pockets for collecting the grease which runs from the axle, bearing brasses sliding into axle boxes from the front, brasses with two wearing surfaces, and a sliding washer to prevent the escape of grease from the box.

Springs are described as being composed of two or more parts laid together, or of several rods or wires twisted or stranded as a rope, and then bent up into a spiral form suited to the purpose for which the spring is required, similar springs being also formed of two, three, or more square or flat bars of metal laid together, and welded or soldered at the two extremities, and then bent up into a spiral form. An improvement in break blocks is described as consisting in plugging the bearing surface with a number of plugs of a harder wood than that of which the block itself is composed, or with plugs of metal. Thus, for instance, break blocks are mostly composed of elm or poplar, and the plugs may be of

oak, beech, or other harder wood, or of tin, lead, pewter, &c., by which means the durability of the wearing surface is greatly increased without perceptibly diminishing its holding or friction giving power, and sanding apparatus is mentioned as being composed of a chest or reservoir for containing sand, attached to some convenient part beneath or in front of a locomotive engine, a hopper being used which communicates with the chest, and terminating in two tubes or spouts, the lower orifices of which come immediately over the rails. The communication between the hopper and the sand chest is opened or closed by a slide valve furnished with a balance weight, or connected to a sliding rod.

[Printed, 1s. 2d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 394.]

A.D. 1851, December 8.—N° 13,848.

GARDINER, PERRY G.—“Improvements in the manufacture of malleable metals into pipes, hollow shafts, railway wheels, or other analogous forms which are capable of being dressed, turned down, or polished in a lathe.”

This invention has reference to the employment of rotating dies or pressing surfaces for swaging or otherwise forming by pressure all articles in malleable metal which are capable of being wrought to the required shape by the action of such rotating dies or pressing surfaces. The patentee thus illustrates the application of the invention to the construction of a railway wheel “to be made out of one mass of malleable or wrought iron. If the mass of iron be heated and placed between two dies, and then forced together by great pressure, a wheel will be produced corresponding in form to the dies employed to shape it, but the wheel so produced will lack the requisite finish of smoothness and polish, and will in almost all cases have cracks and irregularities calculated to destroy its value as a wheel, whereas if, in addition to the pressure in a direct line upon the mass, this pressure were accompanied by a rotary motion of the dies or swages in opposite directions, the mass of iron would be drawn or worked so that its fibres would lie in concentric rings or helical lines, and the result would be a wheel with a beautifully smooth, even, and regular surface, wrought and swaged into one solid mass, and ready to be fitted upon the axis after boring.”

The patentee describes at some length certain arrangements of

machinery suitable for working the dies or swages, the latter being carried by rotating shafts, and certain spindles, screws, and other mechanism being employed in concert therewith, modifications of the arrangements being set forth as applicable not only to the manufacture of wheels, but also to the formation of piping and hollow shafting.

[Printed, 1s. Drawings. See London Journal (*Newton's*), vol. 41 (*conjoined series*), p. 98; Mechanics' Magazine, vol. 54, p. 498.]

A.D. 1851, December 19.—N° 13,863.

POOLE, MOSER. — (*A communication.*) — "Improvements in "apparatus for excluding dust and other matters from railway "carriages, and for ventilating them."

According to the first part of this invention fresh air is admitted into a railway carriage through openings near the roof, or in such roof, such openings being provided with tubes for the reception of air, these tubes being bent, or provided with horizontal branches, through which the air enters the carriage when the latter is in motion. Thus an upright tube may be furnished with two branches, pointing in opposite directions, one serving for the entry of fresh air when the carriage is travelling in one direction, and the other when the motion of the carriage is reversed, an adjustable flap being employed to direct the air in either direction, as requisite. In order to prevent the access of dust, sparks, cinders, and other matters to the interior of the carriage through the ventilators the external openings of the latter are covered with wire gauze or other similar porous material, and a tank of water or other liquid is placed inside the carriage, below the ventilator, in order to intercept any dust or other matter which may by accident pass through the apparatus. In the sides of the carriage are openings which are furnished with what the patentee calls "deflectors," these being "alots" or thin pieces of glass or other material, mounted on pivots so as to be capable of being placed at different angles with the carriage sides, these openings allowing the escape of vitiated air from the interior of the carriage, and in some cases arrangements being made to serve the purpose of windows, several modifications of such windows being described.

[Printed, 8d. Drawing. See Repertory of Arts, vol. 20 (*enlarged series*), p. 101; and Mechanics' Magazine, vol. 54, p. 518.]

A.D. 1852, February 2.—N° 13,951.

SPENCER, GEORGE.—“Improvements in the springs of railway carriages, trucks, and waggons.”

This invention consists of improved modes of applying vulcanized india-rubber, or other suitable elastic material, to the purpose of springs for railway carriages, waggons, and trucks, “and in the parts and combinations thereof, as applied to buffer, draw, and bearing springs.”

The essential features of the invention consist, firstly, in the use of a “confining cylinder,” or case, made of wrought iron or other suitable material, when used for railway carriage buffer, bearing, or draw springs, the object of this cylinder being to increase the resisting force of the springs “by limiting the expansion of the elastic material.”

Secondly, in the use of vulcanized india-rubber or other elastic material for buffer, bearing, and draw springs when formed into rings which are of ridged or rounded form on the outside instead of being cylindrical, the object of this being “to obtain a lateral resisting power from the confining cylinder.”

Thirdly, in the combination of rings of vulcanized india-rubber of various densities or sizes, so as to regulate the resisting power of the spring when used for railway carriage buffer, bearing, and draw springs.

Fourthly, in “the use of any combination of the rings mentioned with reference to the second part of the invention, with the confining cylinder or case, when used for buffer, bearing, and draw springs.

And, fifthly, in the combination of confining cylinder, rings of vulcanized india-rubber, or other elastic material, and certain dividing plates, which are interposed between the rings to keep them separate.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 20 (*enlarged series*), p. 236; *Mechanics' Magazine*, vol. 57, p. 137; *Engineers' and Architects' Journal*, vol. 16, p. 316.]

A.D. 1852, February 14.—N° 13,973.

CALLEN, ARTHUR WELLINGTON, and ONIONS, JOHN.—“Certain improvements in the manufacture of certain parts of machinery used in paper making [and in the material employed therein, which material is also applicable to the construction of]



"certain parts of railways, railway and other carriages [and other similar and useful purposes]."

The only part of this invention which requires notice here consists in casting of malleable iron, or hæmatite ore, "all descriptions of working bearings in railway and other carriages, and in case hardening such portions of the same as are most subject to friction," such casting being performed in moulds in the usual manner.

[Printed *4d.* No Drawings. See London Journal (*Newton's*), vol. 42 (*conjoined series*), p. 200; *Mechanics' Magazine*, vol. 57, p. 178.]

A.D. 1852, March 8.—N° 14,007.

FORDER, AUGUSTUS TURK.—"An improved fender."

This "fender" consists of an apparatus which is to be connected to each end of each carriage or waggon of a railway train, as well as to the front of the engine and the back of the tender, for the purpose of preventing the injurious effects of collisions.

Each fender consists essentially of two parts, one called the "striker," and the other the "receiver." The latter is fixed to the carriage or engine, as the case may be, and is composed of two plates of wrought iron, placed at some distance apart, but secured together by bars or stays passing from one to the other, and in the outer of these plates are a number of openings, over which steel springs are placed. The "striker" is also composed of two plates of wrought iron, secured together, and carrying steel bars called striking bars, these being of different lengths and thicknesses, and the arrangement of the two parts being such that when the striker is driven towards the receiver the shock is first received by a block of wood fixed outside the latter, and the striking bars are then forced in succession against the springs, the longest bars coming into action first, and breaking the springs opposite to them, and the shorter bars following, until the resistance created by the force required to break the springs brings the parts to a stand.

The details of the invention are minutely described, the dimensions of the parts being varied according to circumstances.

[Printed, *10d.* Drawing. See *Mechanics' Magazine*, vol. 57, pp. 258 and 408, and vol. 58, p. 273.]

A.D. 1852, March 8.—N° 14,018.

HODGE, PAUL RAPSEY.—(*A communication.*)—"Certain improvements in the construction of railways and railway car-

"riages, parts of which are applicable to carriages on common roads."

One part of this invention consists in the employment of springs of india-rubber acting in combination with the ordinary steel springs of railway carriages, such india-rubber springs being, however, in some cases used alone.

Another part of the invention consists of a certain steam spring and lifting apparatus, to be attached to the axles and boxes of locomotive carriages, in connection with or without the ordinary springs. And the invention also includes various forms of axle boxes for railway carriages, with double chambers and arrangements of collars and flanges of metal and leather, or any other material, working in a groove or otherwise, either for the use of oil or grease; also the placing of an elastic medium between the wheel and collars, for the purpose of preventing lateral shocks on railway carriages; and also various new forms of metallic wheels, either of wrought or cast iron, separately or combined, one object being to have a centre and hole through it that will not be injured by taking the wheels off the axles. The arms and rims are in some arrangements also capable of removal, and several arrangements are described as applicable in forming wheels of "chilled" metal.

[Printed, 1s. 4d. Drawings. See London Journal (*Newton's*), vol. 42 (*continued series*), p. 120; *Mechanics' Magazine*, vol. 37, pp. 259 and 462; *Engineers' and Architects' Journal* vol. 15, p. 394.]

A.D. 1852, March 24.—No 14,036.

PIDDING, WILLIAM.—"Improvements in the construction of vehicles to be used on railways or on ordinary roads."

The first part of this invention consists in the employment of an elastic material for the spokes of wheels, "such as whalebone, lance, or other springy woods, steel or other springs," or a combination of these, in plates thinly laminated, and formed into a figure of the necessary section, "or in any way that the combination may require," the spokes of such wheels being made elastic for a portion of their length, only two-thirds, three-fourths, five-sixths, or any other fraction of the length, as experience may dictate, the remainder of the spoke being rigid.

The second part of the invention consists in the application and addition of "catches" to the spokes of a wheel such as mentioned above, by which "a portion of the force exerted by the

" springs of a fixed number of spokes, say, 3, 5, or 7, is exerted  
 " at the same time in each spoke as it attains its vertical bearing  
 " on the ground, thus rendering it more secure."

Another part of the invention relates to a mode of constructing the nave " by which friction is materially diminished, and compensation afforded for the wear and tear of the materials used," the nave itself being composed of radiating metallic plates, in combination with plates of vulcanized india-rubber, and certain catches and receivers surrounded by an elastic ring of highly compressed india-rubber and furnished in the interior with friction rollers.

Another part of the invention consists in adapting axletrees of different lengths in such manner as to allow of the tyres of divided tyre wheels being brought nearer to the axletrees, and so facilitate the turning of vehicles provided with such wheels.

The invention also includes the use of a composition consisting of straw, grass, vegetable fibre, raw spent graves, sawdust, bran, dried leaves, fecula, " manufactured mineral wire or plate when " required," chopped leather, resin, gutta percha, glue, gum, bitumen, or other similar binding substances, for the construction of the panels and other parts of railway and other vehicles " not " usually comprised in the word ' framing,' " or fecula alone may be used after being heated and compressed until it resembles horn, the parts of vehicles thus formed being coated and otherwise treated as may seem desirable.

[Printed, 16d. Drawing. See *Mechanics' Magazine*, vol. 57, p. 299; and *Engineers' and Architects' Journal*, vol. 15, p. 394.]

A.D. 1852, April 24.—N<sup>o</sup> 14,089.

**MANSELL, RICHARD CHRISTOPHER.**—" Improvements in the  
 " construction of railways, in railway rolling stock, and in the  
 " machinery for manufacturing the same."

One part of this invention relates to the inside linings and fittings of passenger carriages, and consists in " the use of  
 " springs in connection with framework and slides to allow of  
 " linings being easily removed in parts, and for the purpose of  
 " providing ease and comfort to passengers while travelling."

Another part of the invention relates to railway wheels, and refers more particularly to various new forms, applications, and combinations of tyres to be attached thereto. " Some of them

“ will be used in combination with, and also without retaining rings, and others will be composed of two or more parts, the whole being applied or attached to the bodies of such wheels without the necessity of having holes pierced through their treads, and consequently reducing the risk of breakage of tyres and mischief arising therefrom. One improvement is in the application of plain retaining rings to prevent any lateral movement of tyres on the bodies of wheels, and another is in the application of a new and improved description of tyre to wheels, such being a peculiar arrangement of wrought with cast iron for forming and strengthening the same.”

Another improvement in wheels consists in “ the application of a new description of boss or nave to be fitted to such as run loose on their axle, which is formed with a chamber to contain the lubricating material required, and has its ends arranged as stuffing boxes for the retention of the same, the whole being arranged in connection with its axle.”

Another part of the invention relates to axles, and consists in “ a peculiar manufacture at the ends of their journals, for the purpose of securing wheels that run loose thereon, and also to prevent the mischievous lateral movement of boxes or bearings on their journals.”

Another improvement relates to axle boxes and bearings, and consists in “ certain new arrangements in connection with their wheels and axles, or axles only, for the purpose of making them oil or grease tight; and another improvement is in making and arranging axle bearings in such a manner as to enable them to support vehicles direct from the journal of the axle, and independent of any support from the axle box itself, thus relieving the axle box from any weight excepting its own, and consequently allowing it to remain stationary, and grease or oil-tight during the wear of the bearings; and another improvement is in a new arrangement of axle boxes and axle bearings in connection with wheels and axles, or axles only, to prevent or relieve the unpleasant and mischievous lateral movement so often experienced on the axle journals.”

Another improvement in wheels, axles, axle boxes, and bearings is in their combination with loose wheels, providing and keeping tight the means of lubrication throughout the nave of wheel and axle box, and allowing either the wheels to revolve round their axles, or the axles and wheels to revolve together in the

" axle bearings, as the amount of friction in either case may determine."

The whole of these particulars are set forth at some length, but the details of the invention will only be understood with the aid of the drawings annexed to the Specification.

[Printed, 2s. 10d. Drawings. See *Mechanics' Magazine*, vol. 57, p. 375.]

A.D. 1852, April 29.—N° 14,096.

**BRUFF, PETER.**—"Improvements in the construction of the permanent way of rail, tram, or other roads, and in the rolling stock or apparatus used therefor."

One part of this invention consists in "constructing the wheels of railway carriages so as to permit them to be moved upon any hard level surface with facility." Railway carriages may thus be "run off the rails on to any hard level surface, and either with or without a turntable may be placed in a desired position." To accomplish this, the flanges of the tyres are made "with square faces, and of such increased width as circumstances will allow; but not so as to present any obstruction to their passing through the ordinary railway crossings."

Carriages furnished with wheels of this description are apparently meant to be provided with a wheel arranged to run in a grooved central rail, in order to prevent such carriages from leaving the rails when not required to do so.

[Printed, 8d. Drawing. See *Mechanics' Magazine*, vol. 57, p. 394; *Engineers' and Architects' Journal*, vol. 16, p. 420.]

A.D. 1852, June 18.—N° 14,173.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication.*)—"Improvements in the manufacture of wheels, tyres, and hoops."

One part of this invention consists in "manufacturing tyres and hoops, each tyre or hoop being formed from one bar or piece of cast steel, without weld or joint."

A mode of applying the invention to the construction of the tyres of wheels suitable for railway purposes is described, in which an ingot of cast steel is first subjected to a forging or hammering process by which it is rendered tough and compact, the ends of the ingot or bar being at the same time brought into an enlarged and circular form. An anvil, having in it a suitable recess, is then used to give to the bar a form resembling the section of a double tyre, there being a flange formed on each side of the bar,

and the two circular ends of the latter have then each a hole drilled or punched into it, and the bar is then cut or split by suitable means along the centre, from hole to hole, and the circular ends are hammered in order to harden and compress the metal at those parts, having been previously somewhat expanded, and the corners of the openings of the holes leading into the cut or slot in the bar being rounded off. The slot is then widened by the use of wedges or keys, and the bar is then placed in what the patentee terms a "drawing frame," in which what are called "hooks" are used to draw the bar into a form approaching that of a circle, these "hooks" being inserted into the slot in the bar, and one being moved away from the other by means of a rack and gearing, or both being moved, so as to distend the two sides of the bar. This distension having been carried to as great an extent as may seem desirable, the bar is finally brought into a circular form by the use of anvils, hammers, and segmental pieces which may be moved radially by screws or wedges, being lastly turned in a lathe. A tyre thus formed may be placed upon the arms of a wheel by any of the ordinary processes.

Another mode of carrying out the invention is described, in which an ingot or bar, after being slotted and distended as mentioned above, is finally brought to the requisite circular form by rolling instead of hammering. In this case, however, no flange is formed upon the bar until it arrives at the rolling process, the flange being formed during that operation.

The invention is described at considerable length, all the details being minutely set forth, and the invention embraces a mode of forming small and light tyres "in duplicate," by forging a hoop of twice the necessary width, then rolling it to the proper form, and then dividing it into two by cutting it in a lathe. Either flanged or plain tyres may be produced by this invention, and suitable either for railway purposes or for carriages for common roads, and hoops may be thus produced in the circumference of which teeth may be cut by ordinary means, and toothed wheels of steel thus formed.

[Printed, 1s. 4d. Drawings. See *Mechanics' Magazine*, vol. 57, p. 517, and vol. 59, p. 201.]

A.D. 1852, June 24.—N° 14,176.

LAUDET, JEAN BAPTISTE GEORGES.—"Certain improvements  
" in locomotive engines, part of which improvements are also  
" applicable to other engines."



One part of this invention consists in a mode of arranging the bearings and grease boxes of locomotive engines, in which the bearing which rests upon the journal of the axle is composed of steel, or of tempered iron, and is so shaped as only to be in contact with the axle at three points, viz., the upper part and the two sides of such axle. In the upper part of this bearing is a cavity for the reception of lubricating material, and from this cavity proceed two passages for the conveyance of such material to the axle, these passages opening into those portions of the bearing which do not touch the axle, "so that the axle end in turning" may not fill by its friction the greasing apertures."

Another part of the invention consists in the application to locomotives of "pieces of tempered cast iron, to replace the bearings of the grease boxes, the drawers of distribution, and slides," such tempered cast iron being "hardened by the cooling process, or by chemical means," thus affording a "powerful resistance against friction."

The invention embraces a variety of other particulars, none of which, however, require notice here.

[Printed, 2s. 8d. Drawings. See *Mechanics' Magazine*, vol. 53, p. 86.]

A.D. 1852, June 24.—N° 14,177.

ARNOUX, CLAUDE.—"Certain improvements in the construction of railway carriages."

This invention consists in a mode of constructing railway carriages "in such a manner that they can be placed on two axletrees, in the same way as vehicles drawn by horses, and, being provided with transome plates forming splinter bars, are set on the two fore wheels." According to the ordinary system of constructing vehicles for railways, "they are provided with parallel axletrees to which are fixed the wheels, and the vehicles are directed by means of the resistance which the flange of the wheels presents to the going off the rails," but the result of the improvements is "to remove all strain and all unnatural resistance by directing the vehicles on the way whatever may be the tract."

The details of the invention may be variously modified. The axles may be arranged so as to turn in "chairs," to facilitate the traction and prevent the axle boxes from "clutching," and the fore and hind axles of each carriage are united by being jointed

to a central beam, a "straight shaft" forming the junction of one carriage with another, such shaft being composed of two parts united by a bolt and key, and provided with a spring "to facilitate the starting of a train," certain rods forming "quadri-laterals" connecting the beams and shafts, and the first and last axletree of each vehicle of the train being guided by "small inclined wheels," which, "entering within the tramway, give to the axletree a constant and true direction on the same rails."

[Printed, 1s. 4d. Drawing. See *Mechanics' Magazine*, vol. 58, p. 77.]

A.D. 1852, June 24.—N° 14,182.

**MCCONNELL, JAMES EDWARD.**—"Improvements in steam engines, in boilers, and other vessels for containing fluids, in railways, and in materials and apparatus employed therein or connected therewith."

This invention embraces a large number of particulars, and includes,—

Certain modes of constructing wrought iron wheels with tubular spokes, in which the nave is composed of two distinct pieces of tubular metal, forged or moulded to shape in a matrix, with the aid of steam, the holes for the reception of the spokes being outwardly cylindrical but inwardly elliptical, which causes the inner ends of the tubular spokes, when heated and driven into the holes, to assume a dovetail form and so become firmly fixed in the nave, the rim of the wheel being secured to the spokes in a similar manner, with the aid of plugs. Or the spokes may be secured to the nave and rim by welding, the same "dovetail binding" being secured.

Also, a mode of binding up or tightening the parts of wrought-iron wheels "by the use of jam nuts inside the wheel rim."

Also, certain modes of manufacturing hollow axles, shafts, framing, and other engine or railway details, according to modifications of the system described in the Specification of the Patent granted to the present patentee on the 28th of August, 1851, all of which are fully set forth.

Also a mode of combining the component parts of axles and similar articles "by means of an internal mandril," around which segmental pieces are welded or rolled and drawn out.

Also, certain systems of forming the journals or other recessed

parts of axles and other tubular articles "by a rolling or direct " squeezing compression."

[Printed, 1s. 4d. Drawings. See *Mechanics' Magazine*, vol. 58, p. 37; *Engineers' and Architects' Journal*, vol. 18, p. 113; *Practical Mechanics' Journal*, vol. 5, pp. 97, 107, and 175.]

A.D. 1852, June 24.—N<sup>o</sup> 14,189.

**McCONOCHIE, JOHN.**—"Improvements in locomotive and " other steam engines and boilers, in railways, railway carriages, " and their appurtenances; also in machinery and apparatus for " producing part or parts of such improvements."

The improvements in railway carriages consist, first, "in the " construction of wheels for such carriages with girder tyres;" such tyres being cast in a mould which is composed of sand in the inner, and of "an iron chill" at the outer part, the outer portion of the tyre being thus rendered much harder than the inner parts thereof. The tyre bolts are passed through the inner rim "only towards the centre of the wheel."

Another part of the invention relates to breaks, and consists in "interposing between the break blocks and the break handle a " spring or springs, or other elastic medium, so as to equalize " and distribute on the wheels the power applied to the break " handle, and at the same time compensate for any inequality " that may exist upon either of the wheels."

[Printed, 4s. 6d. Drawings. See *Mechanics' Magazine*, vol. 58, pp. 37 and 221.]

A. D. 1852, June 28.—N<sup>o</sup> 14,193.

**COLEMAN, JAMES EDWARD.**—(*A communication.*)—"Im- " provements in the application of india-rubber and gutta percha, " and of compounds thereof."

One part of this invention consists in forming buffer springs of "hollow elastic india-rubber or other cylinders, containing air " or air and water or other fluid," such cylinders being enclosed in cylinders of metal, and in some cases combined with spiral springs.

Another part of the invention relates to certain modes of constructing draw springs, or elastic connections, of solid elastic cylinders or blocks combined with metallic plates and rings, and embraces "the application of india-rubber or other elastic cylin- " ders or blocks to adjustable or right and left screw draw links;"

a mode of constructing draw links "wherein the elastic action is entirely within the links;" and a mode of constructing elastic draw links, "by combining elastic cylinders or blocks with right and left screw spindles."

Arrangements of similar character are also described as applicable for bearing springs, a hollow cylinder containing air and water being used in some cases, and solid cylinders in others, and the patentee includes in his claims under this head of the invention the application of "a secondary elastic cylinder for the obtainment of a non-recoil action;" the "application and use of elastic cylinders or blocks within the horn plates or axle guides of railway and other carriages;" and the application and use of "solid elastic blocks or cylinders as bearing springs, wherein the axial lines of vertical elastic action are coincident, or in the same plane with the horn plates or side guides."

The invention further includes a mode of constructing railway wheels with a layer of india-rubber or elastic material interposed between the exterior of the rim and the interior of the tyre, in order to "ensure easiness of motion," and also a mode of preventing the jarring of carriage windows and doors "by the interposition of elastic side pieces," between such windows and doors and the framing.

[Printed, 1s. 4d. Drawings. See *Mechanics' Magazine*, vol. 58, p. 54; *Practical Mechanics' Journal*, vol. 5, pp. 154 and 170.]

A.D. 1852, August 12.—N° 14,258.

COLSON, MELOHIOU.—"Certain improvements in the construction of vehicles."

This invention relates "to a new system of conveyance or transport of goods on railways, by which the vehicle and its contents are made to run direct on the rails of the railway, instead of bearing on the axletrees."

The vehicle containing the goods to be carried is composed of two boxes or chambers, constructed of sheet iron or of any suitable material, to contain the kind of merchandise to be conveyed. The boxes may be constructed of a cylindrical or pentagonal form, and be divided in several compartments, according to the various descriptions of goods they are to contain.

The boxes have flanges on their peripheries similar to those of wheels for ordinary railway vehicles, which serve to consolidate

them, and to convey them along the rails on which they travel, these flanges serving in effect as wheels, and an arrangement being described in which two cylindrical boxes or vessels, furnished with flanges, are connected one behind the other to a suitable frame within which they rotate, such frame being provided with lubricating boxes, fastening chains, safety chains, and buffers similar to those of an ordinary truck or carriage.

[Printed, 6d. Drawing. See *Mechanics' Magazine*, vol. 58, p. 156; *Engineers' and Architects' Journal*, vol. 16, p. 112.]

A.D. 1852, November 25,—N<sup>o</sup> 14,347.

BELLFORD, AUGUSTE EDOUARD LORADOUX. — (*A communication.*)—"Improvements in the construction of springs for "railway and other carriages."

This invention consists, first, "in a new arrangement of springs "of caoutchouc, applicable to the suspension of wagons, coaches, "and other carriages."

Secondly, "in the employment of the same springs of caout- "chouc for obtaining elasticity necessary for the cushions of "carriages, chairs, &c. &c."

Thirdly, "in the employment of the same springs for facilitating "the traction by horses and other animals."

The essential feature of the invention consists in the use of washers or rings of india-rubber enclosed within a cylindrical case, and having interposed between them washers of metal, this apparatus being connected with tubes, rods, hooks, links, and other mechanism, according to the purpose for which the spring is to be used, the invention being described under a great variety of modifications.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 58, p. 496.]

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## PATENT LAW AMENDMENT ACT, 1852.

1852.

A.D. 1852, October 1.—N° 31.

LEE, JOHN DUNKIN.—“Improvements in covering railway trucks and other vehicles.”

Before describing the details of this invention the patentee states that heretofore “covers of carriages have for the most part been pulled over hoops,” but that according to his improvements “the covers are combined with and moved by levers, the covers travelling on rods.” He then describes an arrangement in which the cover, which is composed of “Macintosh” or other suitable fabric, is connected to a series of straight horizontal rods, “on and with which the cover travels,” these rods being furnished with eyes or rings at the ends, which embrace arched rods mounted above the ends of the vehicle, and being drawn into different positions thereon, so as to open or close the cover, by means of cords passing over pulleys and acting as “continuous levers,” for which, however, other forms of lever may be substituted. The invention is described more especially with reference to a railway truck, but may be modified to suit other vehicles.

[Printed, &c. Drawing.]

A.D. 1852, October 1.—N° 59. (\* \*)

DAVIS, MARCUS.—Several improvements in the construction of wheels are included in this Specification. The patentee proposes to connect the outer ends of the spokes (which are made of metal tubes) to a hollow ring or tubular band of iron or other metal, and to cover this tube with another tube of sulphurized or vulcanized india-rubber, leather, or gutta percha, or with a number of india-rubber rings, so as to cause the wheels to travel without noise along the road. The iron tubular band may be covered with a tube made partly of sulphurized or vulcanized india-rubber, and partly of canvas, cloth, pasteboard, &c., combined in such manner



that the india-rubber will present its surface to the road. Cotton, flannel, cloth, leather, or any soft material of a similar nature, may be placed between the iron tube and the india-rubber or other tube.

The tubular iron band may be open on the outside, so as to present two narrow edges (serving as flanges when the wheels are to run on railways) with a space between, to be filled with wood shavings, hemp, flock, cotton, or other cheap soft material, over which is to be fastened a band of sulphurized or vulcanized india-rubber; and the india-rubber band is to be protected from wear by covering it with sheet steel, such as is used for making clock or watch springs.

Instead of employing tubular bands of iron and india-rubber, wheels may be made with rims of bar or flat iron, curved into a circular form, and affixed to the tubular spokes, so that the edges of the rings or rims shall bear on the road, and their broad sides be parallel to the body of the carriage, or the two edges nearest the spoke may incline towards each other. The space between the rims is to be filled with wood, buffalo horn, metal, or any of the materials before mentioned. For light carriages, the wheels may be made with only one ring or rim.

[Printed, 10d. Drawings.]

A.D. 1852, October 1.—N<sup>o</sup> 75.

EILER, LAURENTIUS MATHIAS.—“An apparatus to release or “ separate carriages on railroads in case of accident, giving at “ the same time a signal of distress.”

According to this invention the carriages of a train are coupled together by means of straps or chains, one end of each of which is connected to a bar mounted at the end of one carriage, such straps or chains passing thence to and being hooked upon studs or pins in a bar mounted at the end of the next carriage, the arrangement being such that so long as the last-named bar is held in a certain position, the connection between the carriages is maintained, such connection, however, being severed when that bar is allowed to turn upon its axis, the straps or chains then slipping off the studs or pins therein. This is prevented, so long as it is desired to keep the carriages connected, by means of a lever mounted upon one of the carriages, and which is hooked at one end, the hooked part entering a mortice in the bar provided

with the studs or pins, and retaining that bar in a certain position, such lever, however, being constantly acted against by springs, the tendency of which is to withdraw the hooked part from the mortice in the second bar. In order to control the working a second lever, placed horizontally, and furnished at one end with a toothed sector, is employed, this lever carrying at one end a wedge piece which holds the first lever in position as long as desired, but is capable of liberating it on being moved by means of the sector and a pinion which is in gear therewith. In addition to this apparatus breaks are provided, which are placed above the running wheels of the carriage, and are forced down upon them by the same springs that act upon the lever first mentioned, when the second lever and wedge part are removed therefrom. And a series of tubes, capable of sliding one within another, are mounted upon the tender, these tubes being closed during the ordinary working of the train, but being expanded, upon the liberation of a pawl from a ratchet wheel, by a spring, in case of accident, this apparatus serving to elevate a fire basket or other signal.

[Printed, 8d. Drawing.]

A.D. 1852, October 1.—N<sup>o</sup> 91.

WALKER, WILLIAM.—(*A communication.*)—"Improvements in "wheels for railway carriages, and in the mode or modes of "manufacturing the same."

This invention consists in casting railway wheels with the rim, the arms, and the enlarged portion surrounding the hub or nave "hollow, and of a curved form, the metal being of a "uniform thickness excepting in the hub (or nave), tread, and "flange," the object being "to allow the various parts to yield "and accommodate themselves to each other during the process "of shrinkage in cooling, and thus avoid the danger of cracking "in case certain portions of the wheel become fixed and cooled "before others," the patentee stating that wheels thus formed, not only from the curved and hollow construction of their several parts, but also from the uniformity of the crystallization of the metal in cooling, are admirably suited to resist without injury "the straining, racking, and twisting to which railway carriage "wheels are subjected."

[Printed, 6d. Drawing.]

A.D. 1852, October 1.—N° 133.

OMMANNEY, HENRY MORTLOCK.—“An improvement in the  
“manufacture of wheels for railway carriages.”

The Specification of this invention is as follows:—

“I first cast the iron to the shape required for the wheel; I  
“then place the wheel in an annealing furnace, and continue it  
“there until the metal becomes decarbonised so as to be rendered  
“partially malleable. By this process of annealing and de-  
“carbonization the wheel is rendered more tough and  
“durable.”

“I claim as of my invention the manufacture of wheels for  
“railway carriages by casting and annealing them as above  
“described.”

[Printed, 4d. No Drawings.]

A.D. 1852, October 4.—N° 198.

BATES, EDWIN.—(*Complete Specification, but no Letters Patent.*)

“Retarding and effectually stopping at discretion railway car-  
“riages,” and also “carriages of all descriptions, for the more  
“safely descending inclined planes, either in the streets or on  
“turnpike roads,” by an apparatus “to be called ‘Bates’s  
“‘break.’”

This Specification is of somewhat extraordinary character. After making some remarks regarding the figure of the earth, centrifugal and centripetal motions, &c., the inventor proceeds to describe this invention as consisting in the use of certain “in-  
“verted centre wheels, or, as they may be termed, centripetal  
“wheels,” which may be so bound by springs, pulleys, weights,  
or elastic bands, that “the impetus of the carriages may in four  
“revolutions be thrown back to the centre of gravity; hence  
“motion in the train must cease.” These wheels may either be  
fixed “under the centre of gravity of each carriage to press upon  
“the earth at an angle of 45 degrees,” or they may be pressed by  
“means of an axle” upon the rail between the ordinary carriage  
wheels; or such a wheel may be “fixed upon the axle of the great  
“wheel of the engine,” and pressure applied thereto, by which  
such engine wheel “can be effectually locked.” The description  
of the invention, however, is by no means clear.

[Printed, 6d. Drawing.]

A.D. 1852, October 5.—N° 217.

GARVEY, MICHAEL ANGELO.—“More effectually dissipating the shock of collision in railway trains, reducing the surfaces exposed to atmospheric resistance, and diminishing oscillation, by making portions of the whole of each carriage elastic in every direction, and increasing the power of the carriage to resist severe pressure, by means of metallic tubes in its longitudinal angles.”

According to this invention each end of a carriage is composed of an iron frame to which are connected planks of wood, slightly curved outwards, and covered with caoutchouc. The two ends of the carriage are connected by four horizontal tubes, these passing from one to the other between points not far from the four corners of the frames, and the roof, sides, and floor of the carriage are connected to these tubes. Placed in the tubes are steel rods, each entering for some distance therein and projecting about two feet beyond the end of the carriage, these rods having collars upon them, inside the tubes, and there being spiral springs between these collars and certain “boxes” or stops, also inside the tubes, the rods and their springs thus resembling spring buffer rods. The ends of the rods projecting from each end of the carriage sustain a “shield,” formed in the same manner as the carriage ends with the exception of the timber not being curved, the rods, however, not being rigidly attached to these shields, but connected with them through the medium of certain volute springs, which permit of a “limited movement of the shield towards every point in its vertical plane,” and the shields and the carriage ends are further connected by india-rubber cloth, the spaces between the ends of the carriage and the shields forming in fact air-tight chambers.

When a number of these carriages are placed together so as to constitute a train they are connected by draw links, &c., in the ordinary manner, the various shields being in contact, and in case of collision they act as buffers, the air between them and the carriage ends, as well as the spiral springs, preventing the ends of the carriages themselves from striking each other, but in order to prevent the bursting of the india-rubber cloth, in case of the air confined thereby being subjected to excessive pressure, openings are provided which are furnished with valves so regulated as to permit the escape of a portion of the air in such case, other valves allowing of the re-entry of air when the pressure is removed,

and the spiral springs restore the shields to their original distance from the carriage ends.

The patentee mentions various advantages as arising from these arrangements, and in particular the capability of the shields for moving not only to and fro, in the manner of ordinary buffers, but also in other directions, this tending to prevent the "doubling up" of a train in case of collision.

[Printed, 10d. Drawing.]

A.D. 1852, October 8.—N<sup>o</sup> 300.

- **CRESTADORO, ANDREW.**—"Certain improvements in impulsion or machinery for applying animal power to railways, waterways, and common roads, and to other mechanical purposes, part of which improvements relate to railways and other carriages, to buffers, springs, breaks, and chains, and in the propelling vessels across liquid elements."

According to one part of this invention long waggons or carriages are placed upon short trucks, each of the latter being mounted upon four wheels, and one truck being placed between and so as to support the adjacent ends of two carriages, the ends of the latter being of semicircular form, and connected to the truck by pins on which they are capable of turning, the passage of a train of carriages round curves in the rails or roads being thus facilitated. The pins which connect the carriages to the trucks are each in the form of an inverted T, and the arms of the pins are secured to the rods or pistons of the buffers, the latter thus assuming positions corresponding with those of the trucks and carriages on passing a curve. The pins pass upwards, and extend above the roofs of the carriages, the pin of one carriage being secured to that of another by a link, and the whole arrangement being such that the carriages and trucks not only accommodate themselves freely to curves, but also to inequalities of level in the rails. Breaks are also described as consisting of rollers, which are capable of being raised and lowered by means of racks and pinions, the rollers, when lowered, resting upon the rails.

The invention is set forth at some length, and includes "double-acting" buffers, these being "as it were two buffers attached together back to back to form one buffer, their pistons or compressing rods being converted into one, and thus rendered available to act both as drawing as well as pushing elastic rod." "Four-acting" bearing springs are also de-

scribed as being constructed of "four distinct buffers attached together as to form one solid piece, the axle of the wheels to be the centre," each of the four rods or surfaces acting separately, and the whole being so arranged that one buffer will support the carriage as the common bearing spring now does, one of the others being at each side of the axle and in a line with it, so as to bear laterally against the framing, and the fourth being an annular buffer "emerging from the centre," the axle passing through it, this being intended to bear against the framing of the waggon "in a direction concentrical with the axle of the wheels," the whole arrangement being intended "for the purpose of subduing on railways the effects of concussion arising from the grinding action of the rails" upon the flanges of the wheels; and on common roads for subduing the effects of concussion arising from the wheels being acted upon in a similar way by the road.

The arrangements also include placing the centre of gravity of the carriages as low as will "permit a suitable clearance from the ground," permitting the ends of the carriages to be open, and thus affording a free passage throughout the train; as likewise enabling carriages to be constructed if desired of two stories in height.

The invention also includes certain arrangements for propelling vehicles both on common roads and on railways, and also propelling vessels in water, but those arrangements contain nothing which require notice here.

All the particulars mentioned above appear to be meant for use on common roads as well as on railways.

[Printed, 10d. Drawing.]

A.D. 1852, October 12.—N° 357. (\* \*)

DAFT, THOMAS BARNABAS. — "Improvements in inland conveyance."

1. The permanent rails are of wood, with a width between them of about thirty inches, and fixed on transverse sleepers. The upper surface of the rail is formed into a kind of shallow rectangular gutter to retain the water continually thrown upon it from a tank to keep it moist. Sometimes the fluid is mixed with soap to increase the slipperiness of the rail. The vehicles for passengers are formed like sledges, and carry two travellers on each seat.



The sledges have on the under side of their framework "glass" skates" with flanges of a figure to suit the rail it has to travel on. The sledges are arranged in trains, which are drawn by a steam engine on the ordinary locomotive model. The driving wheels are wide enough to have a breadth of four to five inches of "skate or wheel bite." The tire of these wheels is covered with vulcanized india-rubber about an inch in thickness. When the sledges have to travel over an acclivity, an open rack is fixed between the rails, which gears into the teeth of a wheel on the propelling carriage with teeth on its periphery, and is turned by the engine.

The rails are sometimes formed by dividing a square diagonally, and bolting them down to the sleepers; the tire then clips the rail.

The cylinders are placed at the end in advance of the smoke box. The boiler is as wide as the gauge; the skates in the rear allow a water tank and stoker's stage to be set between them.

[Printed, &c. Drawing.]

A.D. 1852, October 13.—N° 361.

OATES, JOSEPH PIMLOTT.—"An improved spring or improved "springs for carriages."

This invention relates to a mode of constructing springs of caoutchouc or india-rubber, whether vulcanized or otherwise, such springs being composed either of perforated discs or rings placed side by side, or of short concentric tubes placed one within another, the discs or tubes in most cases being held together by two "axles" or rods, having washers at the ends. When such springs are used as bearing springs the body of the carriage is hung upon the lower axis, the other being attached to the framing. Such springs are also described as being applicable to buffers, the buffer rods being connected at their inner ends to a cross bar carrying a projection resembling in form the letter T, a second cross bar being fixed to the framing of the carriage and provided with a similar projection, opposite the first, and rings of caoutchouc being placed upon the arms of the T-pieces, the result being that on the buffer rods being driven inwards the rings are stretched. Those parts of the T-pieces which are nearest each other are semi-cylindrical in figure, so that when the parts are at rest they form a "cylindrical core" to the rings. Double springs may also be

formed by connecting the axes on one side or end of each of two springs by means of links, and such double springs may either have the outer axes fixed and the force be applied to the links, or the latter may be fixed and the force be applied to the outer axes.

A double or compound spring may also be formed by the use of three axes and two sets of rings; and springs made according to this invention may be combined with steel springs, an iron link of oblong form being lined with caoutchouc, the pins which pass through the link, and connect the steel spring with the framing of the carriage bearing against the caoutchouc. Or rings of the latter may be placed around the pins.

[Printed, &c. Drawing.]

A.D. 1852, October 13.—N° 362.

**TATHAM, WILLIAM.**—"An improved mode or improved modes  
" of preventing accidents on railways."

This invention relates, firstly, to a stationary apparatus which may be placed upon a line of railway, and is capable of being so adjusted that if necessary it will shut off the steam, either partially or wholly, from the engine of a passing train, apply the breaks, and sound the whistle of such train, or bring into action some other signal. The apparatus consists in the first place of a short rail, mounted at one end upon a fixed fulcrum, between the rails, and being so bent at the other end that when the latter is raised the rail forms in effect a double inclined plane. This raising may be effected by means of a handle and a rod or chain proceeding therefrom to a small lever mounted upon a cross shaft carrying a cam, the handle being moved in one direction turning the cam so as to cause it to lift the rail, while on the handle being released the cam is turned back by the action of a small weighted lever, also fixed upon the cross shaft. The rail when raised will act through the medium of certain levers, rods, catch boxes, chains, and other mechanism carried by the engine and carriages of a passing train and so sound the whistle, partially or wholly cut off the steam, and apply the brakes. This mechanism is somewhat complex, and will not easily be understood without the aid of the Drawing annexed to the Specification, being, moreover capable of different modifications.

Arrangements are also described by means of which the guard of a passing train may cause the inclined rail to rise and so act upon the whistle, steam, and breaks of a following train. Thus

the guard's carriage may have underneath it, fixed to or mounted in the framing, an inclined bar, one end of which being depressed will come into contact with a friction pulley at the end of a small lever mounted on the cross shaft carrying the cam, mentioned above, and so raise the inclined rail, the parts being retained in this position by a catch, which falls into a notch in a sector carried by another lever also on the cross shaft, until the train has proceeded for a certain distance, when the inclined bar will come into contact with another lever, mounted upon another cross shaft, the latter also carrying a second lever connected to a rod or chain by which the catch is liberated, when the weighted lever again turns back the cam. Thus a succession of apparatus may be set along a line of railway by a passing train, and again disengaged, a given distance between one train and another being thus maintained. The inclined bar connected to the guard's carriage is so arranged that it will give way in case the apparatus on the line is out of order, the moveable end being combined with a spring and certain buffer heads, and damage to the apparatus in such case being thus prevented.

The invention also includes apparatus by means of which the guard, from his carriage, may sound the whistle of the engine and shut off the steam as well as the engine driver himself, this apparatus consisting essentially of an upright handle carrying a sector to which are connected a series of cords or chains extending the whole length of the train, and reaching to the steam valve and whistle of the engine. A mode of sounding a whistle in the guard's carriage itself is also described, this being effected by the use of a fan or blower which may be put in motion by means of friction pulleys, one of which is on the axis of the blower and the other attached to one of the axles of the carriage, the two pulleys being brought into contact when necessary by means of a foot plate. Instead of employing rods or chains for connecting the different parts of the apparatus on the line such connection may be formed by means of water placed in tubes laid along such line, the tubes being furnished with rams which may be moved to and fro as requisite, all these details being capable of modification.

By the arrangement of cords or chains mentioned above as extending the whole length of the train the whistle is sounded on the engine, and the steam shut off, in case of any of the links or coupling chains of the carriages breaking and one part of the train becoming detached from the other. And in case such detached portion should run back down an incline, the breaks of

such portion will be brought into action by the inclined rail last set in position.

The invention also includes certain "self-acting signal lamps," but these will be noticed in another series of Abridgments.

[Printed, 8d. Drawing.]

A.D. 1852, October 25.—N<sup>o</sup> 519.

FITZPATRICK, MATHEW. — "Certain improvements in machinery or apparatus to be applied to locomotive engines and carriages, for the prevention of accidents, and also in the manufacture and application of indestructible and non-rebounding cushions, to be applied to the above, and for other similar purposes."

This invention relates, firstly, to a "double-action break," which, according to the description given, but which is by no means clear, apparently consists of two vertical bars capable of sliding up and down in bearings in front of a locomotive engine, these bars having at their lower ends "shoes," which are made to press upon the rails either through the medium of a handle connected with a horizontal rod, to which is attached a chain connected with an arrangement of levers, or through the medium of a large "cushion" constituting a species of buffer, which in case of collision acts upon such levers, the result in both cases being that the "shoes" are pressed upon the rails with such force as to raise the driving wheels of the engine from them.

Another part of the invention relates to an "anchor-wedge lever," which is to be applied to trucks, vans, and carriages, this consisting also of vertical bars furnished with shoes, similar to those already mentioned, but made to act upon the rails through the medium of a horizontal bar carrying a wedge, which is made to act upon them, as in the first case, either by means of a handle and a horizontal rod, or a cushion forming a buffer. This cushion forms a third part of the invention, and is composed of leather, gutta percha, or other suitable material, and has enclosed within it a quantity of wool or other suitable substance, along with a quantity of air, the latter being allowed to escape when the cushion is compressed by means of valves, other valves allowing the re-entry of air when the compression ceases, the elasticity of the wool or other substance being apparently meant to then return the cushion to its first form. The cushion is in all cases partially sustained by a spiral spring hooked upon a projecting bar attached to the engine or carriage, other spiral springs lifting the bars and

shoes so as to raise the latter from the rails when the action of the cushion (or handle) thereon ceases.

[Printed, 8d. Drawing.]

A.D. 1852, October 30.—N<sup>o</sup> 587.

ROCK, JAMES, the younger. — "Improvements in railway carriages."

The object of this invention is "to enable railway carriages to carry a larger number of passengers than hitherto, and with greater security." Each carriage is formed "with two tiers of seats, the body being placed low in order to give the necessary head room for the passengers in each tier. Access is given to the upper tier by means of side doors and staircases or steps, and to the lower or ground tier by means of doors placed at the ends, the body having a projecting platform, protected by railing at each end, to enable passengers to enter at the end doors. A passage or thoroughfare is made from end to end of each carriage on the lower floor."

The wheels of the carriage are placed under the staircases, and closed in from the body of the carriage by wooden partitions. The buffers are so arranged as to give "foot room" for the passengers in the lower compartment, being provided with levers crossing each other and acted upon by springs which also serve as "draught springs." "By this arrangement the buffers have the power of adjusting themselves to any angle when the carriage is traversing a curve." When the upper tier of seats is uncovered, such seats must be supported by the framing of the staircases, and by other framing, but when the upper seats are uncovered, the carriage is strengthened by upright pillars, cross beams, and suspending rods. The details of the invention are very fully described.

[Printed, 1s. Drawings.]

A.D. 1852, November 5.—N<sup>o</sup> 641

HALL, COLLINSON. — "An apparatus to be used in the carriage of solid and liquid bodies."

This invention consists, in the first place, in the construction of a "cask revolver or carriage," which is composed of a large cask or revolver mounted upon pivots or axles fixed in the ends, and working in bearings in a suitable frame furnished with shafts, by means of which it may be drawn along by a horse, the cask

being surrounded by metallic discs or tyres of larger diameter than the cask, and serving as wheels thereto. The cask is provided with a man-hole, through which it may be filled with material, such man-hole being furnished with a suitable cover. A modification of the machine is described as being applicable for watering roads, the distribution of liquid manure, and other purposes, in which the axes of the revolver are hollow, one serving for the introduction of a syphon, by which the liquid is conveyed to a trough near the ground, from whence it is discharged, the opening in the other axle serving for the admission of air into the cask, this opening being fitted with a valve. These revolvers may be so arranged as to serve for railway vehicles, being for this purpose mounted in framing furnished with flanged wheels of the usual character, and an arrangement is described in which two revolvers are placed, one behind the other, in the same framing, and propelled along common roads by a locomotive engine, the latter carrying strap wheels, from which straps proceed round the peripheries of the revolvers, thus causing them to rotate. These vehicles may be used for the transport of any liquids in which "agitation may be useful in preventing the deposit of a sediment," and also for the carriage of grain, gunpowder, and other articles.

[Printed, 8d. Drawing.]

A.D. 1852, November 8.—N° 678. (\* \*)

Longbottom, Robert Isaac.—(*Provisional protection only.*)

—"Improvements in preventing vibration in railway and other carriages, and in axles." These improvements are, surrounding "the axle, the arms, and the boxes of carriages with felt, vulcanized india-rubber, or other suitable non-conducting medium, whereby the sound consequent on vibration is absorbed, and vibration is prevented from being communicated to the axle and also to the body of the carriage. Crystallization of the axles will thus generally be entirely obviated."

[Printed, 4d. No Drawings.]

A.D. 1852, November 9.—N° 692.

Newton, William Edward.—(*A communication.*)—"Improvements in the construction of axles or axletrees."

According to this invention a solid axle is in the first place formed, upon which are then mounted two separate tubular axles;



one wheel being connected to each of the latter, and the passage of the wheels round curves being thus facilitated. The hollow axles are kept in position by flanges formed or fixed upon the solid axle, the inner ends of the hollow axles being themselves provided with flanges which bear against those on the solid axle, certain rings and bolts keeping the whole together. Or the solid axle may have only one flange, those of the hollow axles being held against the sides thereof by rings and bolts, these arrangements being capable of different modifications, and allowing the "bearings" to be placed either inside or outside the wheels.

[Printed, 6d. Drawing.]

A.D. 1852, November 11.—N<sup>o</sup> 705.

NICHOLLS, ROBERT HAWKINS.—(*Provisional protection only.*)  
—"Stopping railway carriages."

In this invention a break is employed which consists of "a loose block of wood cut to fit the periphery of the wheel," such block being "placed by a mortise upon a bar extending from one wheel to the other," and an "oblong hole" being cut in the outside rim of the block "to let in the ends of two rods or bars." These rods or bars "are fastened by pivots to an axle or spindle, which is placed underneath and across the carriages; the ends of the axles run in sockets which are fixed at any given point between the wheels. Two loose rods are placed on the upper, and two on the under side of the axle by pivots as before stated. The ends of these rods are put into the holes in the block which acts as a break or stop, and by turning the axle in its sockets these rods will force the break against the rim of the wheels. A lever is fixed on the end or ends of the axle in a perpendicular direction, extending up to the top of the carriage, or to such a height as may be found necessary. A chain or connecting rod is fixed on the top of the lever either by a pivot or universal joint. A similar break is put to every carriage. The connecting rods of the carriages are joined together by a chain or other convenient fastening along the whole line of carriages. Another lever is fixed, either to the end carriage, or to the tender, and is joined to the connecting rods before-mentioned on the top of the carriages, coupling them all together. By the use of this lever a simultaneous action will take place along the whole line of carriages, and every wheel of every carriage will have friction applied to it in proportion to the power applied to the lever."

The patentee mentions that the "double rods" give the break a "double action;" that it will be "equally efficient whichever end of the carriage may be put first," and that by "additional rods and breaks the wheels can be clasped if such be found necessary."

[Printed, 4d. No Drawings.]

A.D. 1852, November 19.—N° 779.

ROCK, JAMES, the younger.—(*Provisional protection only.*)—  
"Improvements in buffers."

This invention relates to an arrangement "by means of which the force of impact on the buffer head on one side of the carriage is transferred to the framework of the opposite side," this arrangement enabling the buffers "to adjust themselves to each other when the carriages to which they are attached are traversing curves." The arrangement consists in mounting the buffer heads upon the projecting ends of either bent levers provided with springs, or of bent springs which serve the purpose of both springs and levers, the form of these levers or springs being such that they cross each other inside the framing of the carriage, the lever or spring of each buffer head being thus jointed or attached to the framing on the opposite side of the carriage from that in front of which such head projects.

[Printed, 6d. Drawing.]

A.D. 1852, November 22.—N° 814.

HEGGIE, ROBERT.—"Improvements in railway brakes."

The object of this invention is to enable an engine driver to bring into simultaneous action the brakes of all the carriages or waggons of a train. Each carriage or waggon is provided with brake apparatus, "of any convenient kind," but so arranged as to be brought into operation "by the mere traverse of a single central bar or brake rod." "When the carriages are placed together to form the train the ends of all these brake rods come into contact in one unbroken line, so that any pressure applied to one end rod puts the whole of the brakes down or into frictional contact with the wheels. The necessary actuating power for this line of brakes is obtained from a simple apparatus carried on the engine or tender." For example, one of the axles of the engine or tender may have upon it "an eccentric

"of very small throw," a rod passing from this and communicating with "a species of ratchet detent apparatus, so that at each movement of the eccentric rod a sliding rod or bar, in end contact with the first of the series of brake rods on the carriages, is urged slightly forward, and held, after each impulse, by a suitable detent." Thus the detent apparatus being brought into action its movement "gradually winds up, as it were, the whole of the brakes, by continually urging the line of rods forward in slow or minute stages. By this means the train is quickly stopped, and when the detent is thrown out a spring on each brake brings the whole series out of contact with the wheels and entirely removes the brake action."

The details of the invention may be variously modified, and include an arrangement by which the brakes are all brought into action in case of the train sustaining a concussion, the brake rods in this case acting upon levers, which, through the medium of certain slotted discs and connecting links, press the brakes against the wheels, the rods operating upon the levers by means of "intermediate helices," and such rods in both arrangements being provided with "buffer heads."

[Printed, &c. Drawing.]

A.D. 1852, November 23.—N° 824.

WINTER, JOHN.—"Improvements in the mode of combining bars of iron so as to form larger masses or pieces of iron, applicable in the manufacture of axles, shafts, columns, beams, cannon, and other articles."

According to this invention iron bars of various sections are used in combination. Thus, according to one arrangement, a number of bars are each rolled with a longitudinal dovetail groove therein, and arranged in two circles, one within and concentric with the other, the arrangement being such that the dovetail projections left on each side of one bar enter the groove in the centre of another, the whole thus becoming interlocked together, and forming a hollow shaft or column, the bars being further welded together, if desirable. Instead of two concentric circles of such bars, three or more may be used, the inner bars in such cases having grooves on both sides. Bars of **OC** section may also be used, and the bars employed may be of deeper section in some parts than in others, producing a shaft or other article of greater

strength in one part than in another. Thus a railway carriage axle may be produced which shall be hollow, but at the same time stronger at the ends, being those parts which receive the wheels and work in the bearings, than in the middle, the bars used being of deeper section at the ends than elsewhere, but the outer diameter of the axle being uniform. And by rolling the bars of suitable section articles either hollow or solid, or partly hollow and partly solid, and of either tapering or uniform thickness, may be produced.

[Printed, 1s. 6d. Drawings.]

A.D. 1852, November 23.—N° 825.

WINTER, JOHN. — "Improvements in the manufacture of wheels."

This invention relates principally to the formation of the naves or bosses of wheels, and is described under various modifications. The essential features of the invention consist, firstly, in "the formation and combination of rolled bars of iron so that they shall form recesses, grooves, or notches for the insertion of the spokes of the wheel," and secondly, in "the formation and combination of such rolled bars of iron so that they dovetail and interlock with each other, or cover each other's joints, and together form a nave or boss, without any through line or joint from the interior to the periphery of the nave or boss;" the invention also including "the formation of spokes with thickened ends or with strait ends, and wedges combining or fitting into corresponding recesses in the nave."

When the parts or pieces meant to compose a nave have been put together and the ends of the spokes inserted into the notches or recesses prepared for their reception the whole are heated and welded together, an iron disc or washer being, if desirable, placed on each side of the nave. The invention is illustrated by various drawings explanatory of different modes of carrying the same into effect.

[Printed, 1s. 10d. Drawings.]

A.D. 1852, November 23.—N° 831.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Improvements in the construction of and method of applying brakes to railroad carriages, engines, and tenders for the purpose of preventing collisions."



one wheel being connected to each of the latter, and the passage of the wheels round curves being thus facilitated. The hollow axles are kept in position by flanges formed or fixed upon the solid axle, the inner ends of the hollow axles being themselves provided with flanges which bear against those on the solid axle, certain rings and bolts keeping the whole together. Or the solid axle may have only one flange, those of the hollow axles being held against the sides thereof by rings and bolts, these arrangements being capable of different modifications, and allowing the "bearings" to be placed either inside or outside the wheels.

[Printed, 6d. Drawing.]

A.D. 1852, November 11.—No 705.

NICHOLLS, ROBERT HAWKINS.—(*Provisional protection only.*)  
—"Stopping railway carriages."

In this invention a break is employed which consists of "a loose block of wood cut to fit the periphery of the wheel," such block being "placed by a mortise upon a bar extending from one wheel to the other," and an "oblong hole" being cut in the outside rim of the block "to let in the ends of two rods or bars." These rods or bars "are fastened by pivots to an axle or spindle, which is placed underneath and across the carriages; the ends of the axles run in sockets which are fixed at any given point between the wheels. Two loose rods are placed on the upper, and two on the under side of the axle by pivots as before stated. The ends of these rods are put into the holes in the block which acts as a break or stop, and by turning the axle in its sockets these rods will force the break against the rim of the wheels. A lever is fixed on the end or ends of the axle in a perpendicular direction, extending up to the top of the carriage, or to such a height as may be found necessary. A chain or connecting rod is fixed on the top of the lever either by a pivot or universal joint. A similar break is put to every carriage. The connecting rods of the carriages are joined together by a chain or other convenient fastening along the whole line of carriages. Another lever is fixed, either to the end carriage, or to the tender, and is joined to the connecting rods before-mentioned on the top of the carriages, coupling them all together. By the use of this lever a simultaneous action will take place along the whole line of carriages, and every wheel of every carriage will have friction applied to it in proportion to the power applied to the lever."

The patentee mentions that the "double rods" give the break a "double action;" that it will be "equally efficient whichever end of the carriage may be put first," and that by "additional rods and breaks the wheels can be clapsed if such be found necessary."

[Printed, &c. No Drawings.]

A.D. 1852, November 19.—N° 779.

ROCK, JAMES, the younger.—(*Provisional protection only.*)—"Improvements in buffers."

This invention relates to an arrangement "by means of which the force of impact on the buffer head on one side of the carriage is transferred to the framework of the opposite side," this arrangement enabling the buffers "to adjust themselves to each other when the carriages to which they are attached are traversing curves." The arrangement consists in mounting the buffer heads upon the projecting ends of either bent levers provided with springs, or of bent springs which serve the purpose of both springs and levers, the form of these levers or springs being such that they cross each other inside the framing of the carriage, the lever or spring of each buffer head being thus jointed or attached to the framing on the opposite side of the carriage from that in front of which such head projects.

[Printed, &c. Drawing.]

A.D. 1852, November 22.—N° 814.

HEGGIE, ROBERT.—"Improvements in railway brakes."

The object of this invention is to enable an engine driver to bring into simultaneous action the brakes of all the carriages or waggons of a train. Each carriage or waggon is provided with brake apparatus, "of any convenient kind," but so arranged as to be brought into operation "by the mere traverse of a single central bar or brake rod." "When the carriages are placed together to form the train the ends of all these brake rods come into contact in one unbroken line, so that any pressure applied to one end rod puts the whole of the brakes down or into frictional contact with the wheels. The necessary actuating power for this line of brakes is obtained from a simple apparatus carried on the engine or tender." For example, one of the axles of the engine or tender may have upon it "an eccentric



"of very small throw," a rod passing from this and communicating with "a species of ratchet detent apparatus, so that at each movement of the eccentric rod a sliding rod or bar, in end contact with the first of the series of brake rods on the carriages, is urged slightly forward, and held, after each impulse, by a suitable detent." Thus the detent apparatus being brought into action its movement "gradually winds up, as it were, the whole of the brakes, by continually urging the line of rods forward in slow or minute stages. By this means the train is quickly stopped, and when the detent is thrown out a spring on each brake brings the whole series out of contact with the wheels and entirely removes the brake action."

The details of the invention may be variously modified, and include an arrangement by which the brakes are all brought into action in case of the train sustaining a concussion, the brake rods in this case acting upon levers, which, through the medium of certain slotted discs and connecting links, press the brakes against the wheels, the rods operating upon the levers by means of "intermediate helices," and such rods in both arrangements being provided with "buffer heads."

[Printed, 8d. Drawing.]

A.D. 1852, November 23.—N<sup>o</sup> 824.

WINTER, JOHN.—"Improvements in the mode of combining bars of iron so as to form larger masses or pieces of iron, applicable in the manufacture of axles, shafts, columns, beams, cannon, and other articles."

According to this invention iron bars of various sections are used in combination. Thus, according to one arrangement, a number of bars are each rolled with a longitudinal dovetail groove therein, and arranged in two circles, one within and concentric with the other, the arrangement being such that the dovetail projections left on each side of one bar enter the groove in the centre of another, the whole thus becoming interlocked together, and forming a hollow shaft or column, the bars being further welded together, if desirable. Instead of two concentric circles of such bars, three or more may be used, the inner bars in such cases having grooves on both sides. Bars of  $\odot \odot$  section may also be used, and the bars employed may be of deeper section in some parts than in others, producing a shaft or other article of greater

strength in one part than in another. Thus a railway carriage axle may be produced which shall be hollow, but at the same time stronger at the ends, being those parts which receive the wheels and work in the bearings, than in the middle, the bars used being of deeper section at the ends than elsewhere, but the outer diameter of the axle being uniform. And by rolling the bars of suitable section articles either hollow or solid, or partly hollow and partly solid, and of either tapering or uniform thickness, may be produced.

[Printed, 1s. 6d. Drawings.]

A.D. 1852, November 23.—N<sup>o</sup> 825.

WINTER, JOHN. — "Improvements in the manufacture of wheels."

This invention relates principally to the formation of the naves or bosses of wheels, and is described under various modifications. The essential features of the invention consist, firstly, in "the formation and combination of rolled bars of iron so that they shall form recesses, grooves, or notches for the insertion of the spokes of the wheel," and secondly, in "the formation and combination of such rolled bars of iron so that they dovetail and interlock with each other, or cover each other's joints, and together form a nave or boss, without any through line or joint from the interior to the periphery of the nave or boss;" the invention also including "the formation of spokes with thickened ends or with strait ends, and wedges combining or fitting into corresponding recesses in the nave."

When the parts or pieces meant to compose a nave have been put together and the ends of the spokes inserted into the notches or recesses prepared for their reception the whole are heated and welded together, an iron disc or washer being, if desirable, placed on each side of the nave. The invention is illustrated by various drawings explanatory of different modes of carrying the same into effect.

[Printed, 1s. 10d. Drawings.]

A.D. 1852, November 23.—N<sup>o</sup> 831.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Improvements in the construction of and method of applying brakes to railroad carriages, engines, and tenders for the purpose of preventing collisions."

This invention is described at considerable and unnecessary length, but the essential features of the invention will be sufficiently understood from the following statement of what is claimed by the patentee, and which consists:—

Firstly, in the use of a spiral spring or its equivalent, “in connection with and so applied to a windlass and chain connected to the brakes, as when distended to some extent it will force the brakes against the wheels with the power necessary to arrest their revolutions under ordinary circumstances.”

Secondly, in the use of “a windlass barrel and rope, or equivalents, so applied to such spiral spring as to enable a person by pulling upon or creating a draft upon such rope to coil up or contract the said spring, and relieve the pressure of the brakes on the wheels.”

Thirdly, in the use of a ratchet “and spring pall (with or without its leading rope or chain) and a second windlass, or equivalents, so applied to the windlass band of the spiral spring as to be capable of holding and retaining the spring in its contracted state, and to whatever extent it may be coiled or contracted by the action of the windlass, the whole of the combination being applied to the brakes, so as to enable one engineman or attendant not only to remove the pressure of the brakes on the wheels induced by the spring and prevent such from taking place, but, whenever desirable, to set free the spring, so that it may uncoil and again produce the pressure on the brakes as stated.”

Fourthly, in the use of an “adjustable spring clip or clips in combination with the pall lever or levers and the draft rope thereof,” or in combination with certain pulleys and screw shafts acting in place thereof, for the purpose of relieving the brakes when necessary.

Fifthly, in the use of a double windlass “composed of two windlasses of different diameter, acting in combination with a chain and pulley for compressing the rubber spring, and for delivering the said chain, and allowing the spring to exert its power upon the brakes.”

Sixthly, in the use of certain ratchet clutches, “both for communicating the power of the spring to the brake shaft, and for removing the pressure of the said spring from the same,” by disengaging such clutches from each other in the manner set forth.

Seventhly, in an improved mode of "constructing the main windlass barrel placed in the engineer's room, the same consisting in making it of a combination of several windlasses, palls, and ratchets applied to the shaft, and in such manner as to be capable of a separate or combined action."

Eighthly, in the combination of a certain shaft, pulley, traversing nut, screw, stud, and pins, or as equivalent thereto, a certain sliding bar, stud, scroll, and projection, for the purpose of liberating the brakes when requisite.

Ninthly, in the construction of a brake apparatus, "consisting in jointing or hinging the two brakes together at one end of each brake" in combination with toggles at or near the other ends, and between them, when the brakes are formed and applied between the wheels.

Tenthly, in retaining the power gained by the friction of a certain collar on a friction cone placed on an axle, or by the action of a friction wheel on such axle, by means of a spring band, for the purpose of operating the brakes, but at the same time regulating such operation.

[Printed, 1s. 2d. Drawings.]

A.D. 1852, November 24.—N° 837.

**FORDER, AUGUSTUS TURK.**—"Improvements in fenders for railway carriages."

This invention relates to improvements upon that for which a Patent was granted to the present patentee on the 8th of March, 1852, and one improvement consists in making fenders in sets of two or more, thus rendering them smaller, lighter, and more portable than can be the case where one fender only at each end of a carriage is used. Another improvement consists in fixing the striking bars in the frame in such manner that those distant from each other shall successively strike the receiver plate, and so distribute the blow gradually over the surface of the frames, the two longest striking bars of each fender of each set being of the same length. A third improvement consists in placing two or more steel spring plates across each other over the apertures in the receiver, and riveting them to the boiler plate; or, where it is desirable that the fenders should occupy as small a space as possible, placing two such plates crossed over each aperture of the receiver, and fixing such a plate or such plates also on each

of the striking irons. One set of fenders is attached to each end of each railway carriage or truck in such manner as to receive and absorb the whole force of the shock of a collision "except that expended on the ordinary buffers," and the fenders are made of size and strength corresponding with the weight of the carriage or truck, and in order to keep the frame or boiler plates of the striker separate tubes are placed between them, through which the tails of the striking bars pass.

[Printed, 8d. Drawing.]

A.D. 1852, November 27.—N° 894.

CURTIS, WILLIAM JOSEPH.—"Certain improvements in the formation of tramroads or railroads, and carriages that run thereon."

According to one part of this invention, rails for a railway are formed "out of the rough trees of the forest," partially embedded in the ground, and the irregular portions removed so as to make the upper surfaces straight. The vehicles used for travelling on such rails are furnished with very broad wheels resembling rollers, there being no flanges to the wheels, but the edges being bevilled off, the body of the vehicle being of the ordinary construction.

The invention is mentioned as being "adapted for getting out timber from forests," and thus "very useful in new countries." In situations where iron rails can be procured, such rails, however, may be used, and in this case the wheels of the vehicles will not need to be so wide as when the rough wooden rails are used, as in the latter case the trees will be some of them "crooked sideways," and the wheels must be broad enough to cover all such irregularities. The patentee mentions that if the rails are "laid down accurate" the parallel part of the wheel may be about 9 inches wide, and the bevilled parts 3 inches, but that if the rails are not accurate, the parallel part of the wheel must be wider in proportion.

[Printed, 10d. Drawings.]

A.D. 1852, December 3.—N° 939.

NEWALL, JAMES.—"Improvements in breaks, machinery, or apparatus applied to railway and other carriages in motion, and in the mode or method of connecting two or more of such breaks together."

This invention is "self-acting, so far as not requiring the power or assistance of an attendant to attach or apply the break blocks to the wheels, it being only requisite to release a catch for that purpose, and to turn a wheel or screw, or raise a lever or some similar contrivance, to detach them before the wheels are set in motion," the arrangements being applicable either to the "slide-break," or to other breaks. The only improvement in the construction of the break itself consists in making "all the joints conical," so as to admit of adjustment in accordance with the wear and tear of the parts. In one modification of the invention the breaks of a single carriage are brought into action by means of a lever, connected to the central shaft on which are the arms to which the links are jointed which move the break blocks, this lever being connected to a vertical rod having attached thereto a spring or springs, and being provided with a cross arm to which a second vertical rod is attached, this second rod being provided with a rack and wheel and certain gearing by which the vertical rods may be raised and the spring or springs compressed, the rods being maintained in the raised position by a ratchet wheel and catch, and the release of the latter from the wheel at any time liberating the springs and allowing them to depress the lever and so press the breaks against the wheels. The break apparatus of all the carriages of a train may be worked simultaneously by means of shafts, with one of which each carriage is provided, such shafts being mounted above the carriages, and that of one carriage connected to that of another by sliding as well as ball-and-socket joints, these shafts passing through the wheels by which the racks are actuated, and the whole of the latter being thus raised simultaneously; one ratchet wheel and catch sustaining the whole, and the whole descending simultaneously upon the release of such catch. Such an arrangement of shafts may also be used to work a signal from one part of a train to another, or to sound a whistle, or shut off the steam from the engine. In place of the springs mentioned above weights may, if necessary, be used.

[Printed, &c. Drawing.]

A.D. 1852, December 11.—N° 1026.

BATES, EDWIN. — (*Provisional protection only.*)—"Improvements in breaks for railway engines and carriages."

R. C.

X



According to this invention the hinder end of each carriage is provided underneath with a curved projection, and at its front part with a lever extending forward horizontally, having at the outer end a roller, and being secured at the inner end to a round disc having connected to it a spur wheel, which is in gear with a worm or screw at the end of which is a pulley, and there being connected to this pulley one end of a toothed band which hangs below a toothed wheel placed on the axis of one of the wheels of the carriage, the other end of such band being connected to a strong spring placed in a box fixed to the carriage frame. The result of this arrangement is that when a number of carriages thus furnished are connected together by "draw links" so as to form a train, and an obstruction occurs to the progress of the first carriage, the curved incline of the latter depresses the outer end of the lever of the carriage next behind it, and causes the disc, spur wheel, worm, and pulley to press the toothed band against the toothed wheel mentioned above, and so stop the progress of such carriage, a like action then taking place with regard to each succeeding carriage of the train. The invention may be modified by connecting both ends of the toothed band directly to the disc, or by using a second disc connected to the first by a plain band, the second disc carrying a toothed wheel which acts in place of the toothed band.

[Printed, 62. Drawing.]

A.D. 1852, December 11.—N<sup>o</sup> 1028.

WHITE, ARCHIBALD. — "Improvements in apparatus for "retarding and stopping railway trains."

According to this invention each carriage of a train is provided with a break block to each wheel, the blocks being between the wheels and suspended from the carriages by links, being also jointed to levers which are likewise jointed to a tube capable of sliding up and down upon a vertical bar, the result being that on depressing the tube the breaks are forced against the wheels, while on raising the tube they are released therefrom. Each tube is furnished with a rim, upon which a weighted lever rests, this lever, however, being supported, when the breaks are not required to act, by a hook-like projection which fits upon a corresponding projection on the lower side of another lever placed above the weighted lever, this other lever being mounted on a suitable fulcrum, and moved when it is desired that the breaks

shall operate by means of a cord to as to release one projection from the other and so allow the weighted lever to descend and force the breaks against the wheels. Each carriage is furnished with an arrangement of this kind on each side, and with suitable cords for operating thereon, the cords of all the carriages of a train being coupled by suitable means, and capable of being acted upon by a drum or roller mounted upon the engine, which being made to revolve causes them to liberate the weighted levers of the carriages in succession, beginning with those of the last carriage of the train, the various cords having a certain amount of "slack" left in them, such slack being coiled, however, upon conical rollers with which the carriages are provided, such rollers being furnished with springs, and this part of the arrangement being intended to prevent the whole of the breaks from being brought into action simultaneously. Thus on the drum carried by the engine being put in motion, which is accomplished by means of gearing arranged for the purpose, either the whole of the breaks may be successively brought into action, or only those of a certain number of the carriages, and in case the motion of the drum should be continued too far and the cords be thus drawn into an excessive state of tension a knife arranged for the purpose is made so to operate as to cut the cord between the engine and the first carriage of the train, thus preventing damage to the apparatus.

The details of the invention are set forth at considerable length. The drum on the engine is provided with spikes, which prevent the cord from unwinding improperly therefrom, and various catches, loops, springs, guiding tubes, and other minor appendages are described as being employed in directing and controlling the movements of the parts mentioned above, such parts being restored to their first positions when the breaks have been used by a cord provided for that purpose, and certain apparatus connected therewith.

[Printed, 8d. Drawing.]

A.D. 1852, December 13.—N<sup>o</sup> 1047.

RIPLEY, ABRAHAM. — (*Provisional protection only.*) — "Improvements in axles for railway wheels."

In this invention the axle consists of two separate pieces, namely, a tube and a solid shaft, the shaft to be about one-fifth

longer than the tube, and to be passed through the latter, "a nut fixed on to the solid end preventing the tube from coming off, a shoulder or projection on the shaft keeping the tube from passing beyond the required distance," and the whole thus forming "one axle." Between the tube and shaft is a recess or chamber, "to receive the oil or grease used for lubricating the bearings." It is apparently meant that one wheel shall be keyed upon the tube, and the other upon the solid shaft, the inventor stating that the wheels will "act independent of each other, and thus avoid friction in passing over a curve."

[Printed, 4d. No Drawings.]

A.D. 1852, December 16.—N<sup>o</sup> 1074.

PAYNE, JOHN JEREMIAH.—(*Provisional protection only.*)—"An improved axle in two parts, applicable to railway and every other description of carriages and vehicles, both public and private."

This axle "consists of two parts, parallel to each other, and nearly meeting in the centre of an iron plate which is above the axle between the wheels, to which iron plate such two parts are fitted by means of four bearings secured by bolts and nuts, two of such bearings being fitted at the two ends of the axle near the centre of the iron plate between the wheels, and the two other of such bearings being secured in like manner to the ends of the iron plate near the inside of the wheels. The wheels are fixed to the axle, and are enabled to revolve independently of each other, and by means of springs so arranged as to be fitted with bearings on the ends of the axle outside the wheels, and one on each end of the iron plate and bearing inside the wheels will give a more equal weight on the axle, thereby adding to its safety," producing "a more easy and direct draught to the carriage," and allowing the body of the latter to be built so as to extend over the wheels, and thus be of greater width than could otherwise be the case.

[Printed, 4d. No Drawings.]

A.D. 1852, December 24.—N<sup>o</sup> 1162. (\* \*)

WILSON, JAMES GODFREY.—(*Provisional protection only.*)—"Improvements in the construction of carriages and vehicles for railroads and common roads, parts of the said improvements

"being also applicable to parts of locomotive engines used on  
"railroads." The improvements are as follows:—

First, "in the application of a tyre, made or composed chiefly  
"of whalebone."

Second, "in constructing the roofs" so that "the outer cover-  
"ing of the roof and the inner roof or lining" is "placed a  
"distance apart, or so constructed that a free space (so far as  
"practicable) is left between them."

Third, "in the application of gutta percha, formed upon a wire  
"body," "for pannelling and interior fittings of carriages, as  
"also for roofs of carriages or other vehicles. The wire or wire  
"netting being introduced into the gutta percha, or being the  
"foundation upon which the same is to be moulded or formed,  
"gives to the same the strength of a fibrous material."

Fourth, "constructing and applying breaks" so "that the  
"break is made to come in contact or impinge upon the inner or  
"outer side of the rim of the wheel, or the outside of the flange  
"instead as in ordinary breaks, being brought in contact with the  
"edge or periphery of the wheel."

Fifth, "the application of an arrangement whereby the face of  
"the break, being a piece of soft iron, and being made a magnet  
"by the ordinary arrangements and connection with a galvanic  
"or electrical battery, simultaneously with its being brought into  
"contact with the side of the wheel, or flange of the wheel to  
"which it was applied, attracts and holds the wheel."

[Printed, 4d. No Drawings.]

A.D. 1852, December 28.—No 1182.

WEBSTER, JAMES.—"Improvements in the manufacture of  
"springs."

This invention consists in "bending a bar or rod of steel into  
"a double-coned form, the larger part or the base of the one cone  
"being towards the larger part or base of the other."

In carrying out the invention the patentee employs a mandril  
of suitable form, mounted upon an axis, one end of the rod or  
bar to be bent being fixed to the axis by a clamp. On the axis  
and mandril being then caused to revolve the rod or bar is wound  
around one cone until it comes to the larger diameter, when one  
or more cylindrical coils are produced on the mandril, the opera-  
tion then proceeding so as to coil the rod or bar round the other

part of the mandril, "producing the second conical form." The mandril and spring are then removed from the axis, and the mandril, being in two parts, is removed by opening out the spring at the cylindrical portion. The conical portions of the mandril are not formed with smooth surfaces, but have "inclined tracks" thereon, these serving to direct the metal when being coiled around them, and the metal is conducted to the mandril by a guide piece connected to a lever, and moved to and fro by means of a handle.

The patentee shows in one of the drawings annexed to the Specification the application of one of his springs to a draw bar for railway carriages, and also the application of such a spring to a buffer.

[Printed, 10d. Drawings.]

A.D. 1852, December 31.—No 1210.

DIXON, DAVID.—(*Provisional protection only.*)—"An improved arrangement of apparatus for retarding and stopping locomotive engines, tenders, and carriages."

The object of this invention "is to obviate the inconvenience caused by damp or rainy weather in the action of the brakes of railway carriages, engines, and tenders," the wet state of the wheels of such carriages, engines, and tenders, arising from their contact with the wet rails then rendering them slippery, and destroying the efficiency of the brakes. To avoid this the inventor proposes to "key upon the bosses or the axles of the wheels friction pulleys against which the brakes are made to act, and these pulleys being free from contact with the road will be enabled to present the friction surface required for the proper action of the brakes."

[Printed, 4d. No Drawings.]

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A.D. 1853, January 3.—No 13.

VAUDELIN, LAZARE FRANÇOIS.—"Improvements in apparatus for retarding and stopping railway carriages."

In this invention each carriage of a train is provided with a cord, strap, or chain, and these being coupled together by suitable means form a continuous line from one end of the train to the other, one end of this line being connected to a drum or barrel mounted in communication with suitable gearing in the last carriage of the train, so as to be capable of being turned by a hand wheel. According to one modification of the invention each carriage is provided with a lever fixed upon an axis upon which is also a spur pinion, the latter being in gear with rack bars carrying breaks, and the levers being connected to the line or chain, the arrangement being such that on the drum or barrel being turned the line or chain moves the levers and pinions, and so causes the rack bars to press the breaks against the wheels of the carriages, one bar being above and the other below each pinion, which causes the bars of each carriage to move in opposite directions. According to another modification strong ratchet wheels are fixed upon the axles of the carriages, against which projections carried by sliding frames are pressed by springs upon the removal of certain "filling pieces" connected to and moved by the line or chain, the patentee mentioning that lever or sliding clutches may in other cases be brought to bear upon the axles by the action of the line or chain itself.

[Printed, &c. Drawing.]

A.D. 1853, January 12.—N<sup>o</sup> 79.

HICK, JOHN.—"Certain improvements in the method of lubricating revolving shafts and their bearings or pedestals."

This invention relates to the lubrication of railway axles and axle boxes, as well as other axles and shafts. In each brass or other step of the axle bearing, and at right angles or nearly so to the axle itself, a groove or recess is formed, a channel being thus created which extends entirely around the journal of the axle. The lower portion of this channel forms a receptacle for the lubricating matter, the level of the surface of which matter should at all times be below the axle. Small horizontal grooves or channels are also formed in the steps opposite to the central line of the axle and parallel with it. Provision is made for the introduction of lubricating material from the upper part of the bearing, and this material running down into the receptacle already mentioned is then supplied to the axle by means of a metallic or other ring which is placed loosely upon the axle and enters the lubricating



matter below it, this ring revolving by friction of contact with the axle, and thus constantly carrying up a supply of the lubricating matter thereto, the horizontal grooves or channels aiding in spreading such matter over the inner surfaces of the bearings.

[Printed, 8d. Drawing.]

A.D. 1853, January 17.—N° 111.

RYLEY, THOMAS CROPPER, and EVANS, EDWARD.—“Certain improvements in the construction of wrought-iron wheels to be used upon railways and for other purposes, and in the machinery or apparatus connected therewith.”

After making some remarks upon the usual system of constructing wrought-iron wheels the patentees state that their improvements consist, in the first place, “in so rolling the spoke iron that the ends which are to form the nave shall be a sufficient thickness to admit of their being reduced by means of suitable cutting machinery or compressed by hydraulic or mechanical pressure at once into the exact segmental form required to constitute a portion of the nave (when bent and the ends brought together) without the necessity of any subsequent operation of filing or otherwise fitting;” secondly, in “cutting or pressing the ends of the spokes into the requisite segmental form;” and, thirdly, “in the use or employment of suitable cutting or pressing machinery for effecting the said object.” A bar of iron is rolled of any convenient length (one object being to form as many spokes from one bar as practicable) with thickened parts or “swells” at suitable distances asunder, which parts are then compressed in moulds or dies by mechanical or hydraulic power until brought into the “double wedge shape or form.” The bar is then cut into as many pieces as it is to form spokes, each piece being then bent “into the proper triangular form,” the wedge-shaped parts constituting the nave when all the parts composing the wheel are put together.

[Printed, 6d. Drawing.]

A.D. 1853, January 20.—N° 138.

JACKSON, PETER ROTHWELL.—“The manufacture of hoops and tyres for railway wheels and other purposes.”

This invention consists, firstly, “in separating the heavier or more compact portion of cast-iron from that which is lighter or of inferior quality,” this being effected by “causing the metal

“ to run from the blast furnace into diagonal or vertical moulds “ instead of horizontal ones ; by this means the heavier or more “ compact portion of the metal settles at the lower end of the “ mould, and the lighter portion collects at the upper end. When “ the metal or pigs cast in this way are cool, the lower ends are “ broken off, and manufactured into bars of malleable iron in the “ usual manner.” The patentee states that the same object may be attained “ by separating the metal first run from the furnace from “ the after portion of the charge,” and that the bars thus obtained are “ particularly applicable ” for the hoops and tyres of railway wheels.

The invention consists, secondly, in a mode of manufacturing hoops suitable for the inner portions of the tyres of railway wheels, by first twisting a bar of metal and then forming it into a hoop, the ends of the bar being either welded together or otherwise, a second twisted bar being then formed into a hoop of smaller size than the first, and being placed inside it, and a third hoop of still smaller size being placed within the second, the whole being then united by rolling or hammering, or by the use of a “ block,” within which they are placed, and which is provided with a loose bottom formed of segments, and having a hole in the centre large enough to admit the smaller end of a heavy conical block, this block acting against the interior of the smallest hoop and compressing all the three hoops between itself and the inside of the outer block. The outer circumference or “wearing part” of the tyre may be formed in any ordinary manner, and welded to the inner portion either by hammering or rolling, or by the use of blocks as mentioned above.

The invention may be modified by using hoops composed of twisted wire, or small bars united together, or of one long bar coiled up “like an ordinary watch spring,” the whole being united as mentioned above, and, if desirable, steel may be employed in combination with iron in forming such hoops.

[Printed, 4d. No Drawings.]

A.D. 1853, January 26.—Nº 200.

JOHNSON, JOHN HENRY.—(*A communication.*)—“Improve-  
“ ments in the method of lubricating machinery, and in the  
“ mechanism or apparatus employed therein.”

Although this invention is mentioned as being applicable to “all  
“ shafts, spindles, or axles working horizontally,” it is described

mainly with reference to the lubrication of the axles of railway engines and carriages, to which it appears to have special reference. The main feature of the invention consists in the employment of a roller of wood, or thin metal, covered with felt or some other soft and absorbent material, which is placed below the journal of the axle to be lubricated, and immersed for about half its diameter in oil, the latter being contained in a box or reservoir suitably formed, and the roller being constantly pressed upwards against the journal of the axle, not only by the pressure of the oil in the reservoir, but by counterpoises or weighted levers which act upon the shaft or axis of the roller. The latter thus rotates by contact with the axle, and in its rotation carries up a constant supply of clean oil to the latter, the dirty or impure oil sinking to the bottom of the reservoir, in which a channel is formed for its reception, this channel sloping towards the front of the axle box, and being furnished with an opening by which, when requisite, such impure oil may be drawn off. The details of the invention may be variously modified, and include the application of a cork float, furnished with a spindle carrying a graduated inverted cup or bell, by which the level of the oil in the reservoir is indicated.

[Printed, 10d. Drawings.]

A. D. 1853, January 31.—N° 249.

JONES, THOMAS MORETON.—(*Provisional protection only.*)—

“Checking or stopping railway trains of carriages, and steadying  
“the carriages when in motion, and preventing jerking and collision of the carriages.”

According to this invention certain horizontal wheels are so mounted above each axle of each carriage of a train as to be capable of being pressed against the inner sides of the carriage wheels, and so deriving rotary motion therefrom; “one of each pair of the horizontal wheels so in motion, by winding a chain or cord attached to an angular rod, compresses a coiled spring, and when so compressed the curved end of a rod connected with and guiding the break falls over the angular rod, and the spring, when released from the compressure, forces the break on the wheel by means of the guiding rod. The break being semicircular in form wraps the carriage wheel, and its point enters between the wheel and the rail. The pressure of the horizontal wheels against the carriage wheels is produced by a pliable rod of compressible material (and of sufficient length to

“ reach from one set of wheels to another) running between and  
“ propelled by the horizontal wheels from one end of a train to  
“ the other when in motion. The pliable rod runs through and is  
“ kept in its course by tubes placed under the carriages and on a  
“ level with the horizontal wheels. The breaks are released from  
“ the wheels by backing the train, when the pliable rod, by means  
“ of the horizontal wheels, returns to the opposite end of the train,  
“ and in doing so one of each pair of the horizontal wheels moves  
“ a lever, the action of which raises the curved end of the guiding  
“ rod connected with the break out of the pressure of the coiled  
“ spring, when the break becomes free of the wheel. Springs are  
“ fixed at each end of a carriage to raise the coupling irons, and  
“ instead of permanent levers to turn the screws of the coupling  
“ irons a spanner is used capable of being detached.”

[Printed, 4s. No Drawings.]

A.D. 1853, January 31.—N<sup>o</sup> 259.

PIZZIE, WILLIAM.—“ A railway carriage break.”

The object of this invention is to enable the attendant of a railway train to at any time bring into action the whole of the breaks of such train. The breaks are composed of curved blocks, one of which is suspended in front of each wheel, and these are operated upon when necessary by means of rods similar to buffer rods, having heads and springs, and also collars upon them, which when they are thrust back press against cross bars which connect the breaks of one side of a carriage with those of the other. Below the tender of the train are four buffer rods, two of these being apparently meant to act as ordinary buffers while the other two are meant to act upon the breaks of the carriages when desired, the attendant then moving a certain lever, having attached thereto plates with holes therein so as to allow those rods to pass through certain of such holes, these plates at other times keeping such rods out of action. These arrangements are seemingly intended to be brought into operation upon the slackening of the speed of the engine, the attendant then moving the lever with the plates, and the impetus of the tender and the carriages then causing the buffers and apparatus connected therewith to press the breaks against the wheels, in contact with which they are locked by means of certain notched rods and curved bolts so arranged in combination with the draw bars of the carriages as to

lock the breaks when such bars are free and release them when the bars are pulled forward. The details of the invention are not, however, very clearly described.

[Printed, 1s. Drawings.]

A.D. 1853, February 4.—No 310.

ASBURY, JACOB VALE.—“Improvements in railway carriages.”

According to this invention a railway carriage is provided at each end with three buffer rods, each rod having upon it a buffer head, and such head being capable of moving to and fro for a short distance in a short cylinder or shell, there being between the head and the shell a spiral spring. The shells at each end of the carriage are connected to a “buffer plank,” this uniting the three buffer rods, and moving to and fro with them. The rods project for some distance beyond the ends of the carriage, and fixed upon them, inside such ends, are impinging plates or pistons, which, when the buffer rods are driven inwards, act upon springs composed of plates of gutta percha and vulcanized india-rubber rings, combined with recessed iron plates, and placed in cylinders, and also upon gutta percha plates and india-rubber blocks, placed along with recessed iron plates in oblong boxes which are cast along with the cylinders containing the other springs, there being, moreover, within the cylinders first mentioned, and concentric with them, other smaller cylinders containing spiral springs. Behind each line of cylinders and boxes, and nearer to the middle of the length of the carriage, are other cylinders containing spiral springs, and about midway of the length of the carriage are, again, other cylinders containing springs composed of gutta percha, and iron plates, and india-rubber blocks. The rods attached to the buffer heads, and carrying the impinging plates or pistons, pass completely through the first line of cylinders, and have at their inner ends recesses or sockets, into which are inserted the ends of rods passing through the next line of cylinders, and furnished with impinging plates suitable for acting upon the spiral springs in those cylinders, and these rods have also at their inner ends sockets or recesses into which are inserted the ends of other rods furnished with impinging plates to act upon the gutta percha and iron plates and india-rubber blocks in the central line of cylinders. The rods which enter the different sockets or recesses do not, when the buffers are at liberty, reach

to the bottom of such sockets, and thus, when the buffers are pushed inwards, the springs in the first line of cylinders are first acted upon; then, when the sockets are driven completely over the ends of the second line of rods, the springs in the second line of cylinders are compressed, and upon the buffer rods being forced still further inwards, the springs in the central line of cylinders; there thus being a gradually increasing resistance afforded to the passage of the buffers inwards. The heads of the latter are provided with cushions of india-rubber.

The invention is described at very considerable length, in some cases layers of india-rubber, felt, or other suitable material being employed between certain of the moveable parts, in addition to the springs already described, and the patentee mentioning a certain "ornamental division," which would seem to be intended in some cases to work to and fro on the buffer rods outside the carriage, and to become recessed in the latter when the buffers are driven in to the full extent.

The timbers composing the under part of the framework of the carriage are brought much lower than usual, being within a few inches of the rails, and instead of the ordinary bearing springs, cylinders containing packing and iron plates are used, upon which the body of the carriage rests, the framing being composed of timber covered with iron plates. And blocks of india-rubber, placed at the inner ends of those lines of cylinders next the ends of the carriage serve as draw springs, these blocks being acted upon by plates fastened upon the buffer rods, other india-rubber blocks acting as draw springs "when the moveable buffer plank" is coupled up to that of another carriage."

[Printed, &c. Drawing.]

A.D. 1853, February 5.—N° 327.

PALMER, EDWARD. — "Improvements in carriages used on railways."

This invention consists in the construction and application of a "drag carriage," formed to run at the hinder part of a train, this carriage being capable of not only acting as a drag to retard and stop such train, but also of preventing collisions between such train and others which may be travelling at a quicker rate behind it. "This hinder or drag carriage runs ordinarily on four" or it may be more wheels, and the peculiarity is that the two



“ side framings of this drag carriage are (on their under surfaces)  
“ made with grooves to fit tightly on the sides of the rails, and  
“ to embrace the upper surfaces thereof, so that when the body  
“ of the carriage is lowered it bears by its two side framings on  
“ the two rails, and slides thereon, and offers great friction to  
“ the progress of the train. The drag carriage may be lowered  
“ by any convenient means. It is, however, preferred to have a  
“ windlass or barrel with chains to give motion to a sliding  
“ frame, to which are applied inclines which rest on or are sup-  
“ ported by the axles of the carriage. Ordinarily there are  
“ horizontal parts of the sliding frame, which are supported by  
“ the axles. When, however, the sliding frame is moved it  
“ brings the inclines over the axles, and the carriage is lowered  
“ on to and rests on the rails more or less, according as it is  
“ desired to offer more or less resistance. The sliding frame  
“ (carrying the inclines) protrudes considerably beyond the back  
“ of the carriage, and is that part which would be struck by an  
“ overtaking locomotive, and would be driven forward, and by  
“ being driven forward would be the cause of the drag carriage  
“ being lowered to the rails. The sledging parts of the sides of  
“ the drag carriage are caused to extend considerably beyond the  
“ back of the carriage, so that an overtaking locomotive, in ad-  
“ dition to driving forward the sliding frame, would run on to  
“ such projecting parts, and thus not only be retarded itself, but  
“ by adding weight to the parts sliding on the rails would retard  
“ the forward train;” and in order to render the locomotive  
itself more fit for the purposes of this invention, “and also to  
“ protect it from injury in the event of its getting off the rails”  
the patentee applies thereto “additional wide wheels,” with  
flanges, “which wheels being of less diameter than the running  
“ wheels are off the rails when the running wheels are on the  
“ rails, but immediately the running wheels get off the rails the  
“ wider supplemental wheels rest on the rails,” and support the  
locomotive, and by their flanges tend to prevent its going further  
from the rails; “and the forward supplemental wide wheels (in  
“ case of a locomotive overtaking another train) being above the  
“ rails more readily run on to the projecting ends of the drag  
“ carriage of the forward train, and they come into action thereon  
“ as above explained.”

[Printed, &c. Drawing.]

A.D. 1853, February 9.—No 340.

REYNOLDS, THOMAS, REYNOLDS, HENRY, and REYNOLDS, STEPHEN.—“Improvements in the means of retarding the progress of carriages.”

This invention consists in a mode of retarding railway carriages “by means of a series of breaks which may be brought to act simultaneously upon the wheels of all the carriages throughout the train. By means of suitable gearing and wheelwork the guard from his place can raise or depress a series of levers, either weighted or otherwise, and which, when caused to descend, will force the breaks in contact with the peripheries of the running wheels, and thereby create such an amount of friction as would soon bring the train to a stand-still. Each set of breaks, or the break of each carriage, is provided with one or a pair of these weighted levers, which are mounted at one end on a pin or stud, and at the opposite end are connected with a sliding block or bar, by lifting which the break levers are raised, and the wheels relieved from the friction of the breaks.”

The details of the invention may be variously modified, and include “coupling the retarding apparatus of railway carriages together by means of universal joints,” whereby “they may be brought into action or released simultaneously.”

[Printed, 8d. Drawing.]

A.D. 1853, February 21.—No 444.

MILES, EZRA.—“Improvements in railway brakes.”

This invention consists “in the application of hydrostatic pressure to the brakes of railway carriages, whereby the brakes of every carriage throughout a train can be brought into immediate action, thus quickly stopping its progress.” This object is accomplished “by fixing beneath each of the carriages, trucks, or waggons a metal tube or tubes in connexion with a cylinder which is screwed to the framing of the carriage in any convenient manner,” these tubes being furnished with suitable joints, so that when a number of carriages, trucks, or waggons are linked together the tubes form an uninterrupted communication from one end of the train to the other, another tube forming a connection between these and the boiler of the engine, this tube being provided with a tap. The whole is so arranged

that the tubes and cylinders below the carriages are filled with water from the tank of the tender, the piston of each cylinder being in connection with certain levers communicating with the brakes. When it is desired that the latter shall operate the tap in the tube communicating with the boiler is opened, and the pressure of the steam upon the water in the boiler acting upon the water in the tubes and cylinders causes the pistons in the latter to rise and so press the breaks against the wheels of the train, the patentee stating that by this means he can bring "a force equivalent to, say, ten thousand pounds, for example, to bear upon each carriage."

The details of the invention are minutely described, and include arrangements for connecting the carriages, &c., together, so as to allow for the action of the buffers during stoppages and for the curvature of the train in passing round bends in the rails. These comprise various arrangements of ball-and-socket joints, sliding tubes, stuffing boxes, and other mechanism, which will only be distinctly understood with the aid of the drawings annexed to the Specification.

[Printed, 1s. Drawings.]

A.D. 1853, February 24.—N° 465. (\* \*)

WALMSLEY, HENRY, and CRITCHLEY, THOMAS.—"Improvements in machinery or apparatus for retarding or stopping railway trains, which machinery or apparatus is also applicable as a signal or communication from one part of a train to the other."

This invention consists of a peculiar description of break apparatus, in which a screw acting on a strong spring extending from one break to the other, forces each break on its respective wheel simultaneously. To connect the breaks from one carriage to another, a shaft is fixed longitudinally under each carriage of the train, with slots at each end into which work compound universal joints; from this shaft the motion may be communicated either to lower the break or give a signal by a vertical shaft and mitre wheels.

Claims.—1. "The method of forming a continuous connexion from one carriage to another."

2. "The method of applying the breaks to wheels of carriages."

3. "The method of communicating signals by means of the

" said continuous connexion, as all of which improvements  
" are described and illustrated in the drawings."

[Printed, 6d. Drawing.]

A.D. 1853, February 28.—N<sup>o</sup> 498.

MURPHY, JAMES.—"Improvements in trucks, waggons, or  
" vehicles for railway purposes."

This invention consists, in the first place, "in making the upper  
" portion or bodies of trucks or waggons used on railways (for  
" carrying articles of such lengths as require the support of two  
" trucks or waggons) to revolve on a centre pin, bolt, or other  
" similar means upon the framework," suitable plates, rollers, or  
blocks being introduced between the body and the framing, in  
order to reduce the friction between them, and stops being pro-  
vided which may be so placed as to permit the body to traverse  
through a limited distance, or be removed so as to allow such  
body to turn completely round.

Another part of the invention consists of means of drawing  
up or tightening the connecting chain between a pair of these  
waggons when loaded, which is performed, according to one  
modification of the invention, by means of a rack attached  
to the coupling hook or shackle, and moved by a pinion the axle  
of which can be turned by a bar or handle, a bolt being passed  
through a hole in the coupling hook or shackle and also through  
certain eye bolts or plates fixed to the carriage, and retaining the  
chain in the state of tension to which it may have been brought.  
Or the chain may be tightened by a nut placed upon a thread  
formed upon the shank of the coupling hook, inside the framing  
of the waggon, such nut being in the centre of a toothed wheel,  
which may be turned by an endless screw or worm.

In order to prevent the destructive action of long beams of  
timber or other long articles upon the outer ends of the trucks or  
waggons on which they are carried, when travelling over an un-  
even line of rails, such outer ends "may be made detached from  
" the other parts of the body, and secured by strong bars on each  
" side of the waggon to a point about the centre of the body;  
" the outer ends in this case being free will remain perfectly  
" steady against the ends of the load, while the carriage rises or  
" falls to the inaccuracies of the railway." The inner ends of  
such waggons may be hinged to the bottom, or to the sides, being

in the latter case made in "two halves," this arrangement facilitating their employment as goods or mineral waggons "when not required for timber."

[Printed, 8d. Drawing.]

A.D. 1853, February 28.—N° 499.

MERRITT, THOMAS EDWARD.—(*Provisional protection only.*)—"Improvements in railway carriages, and in connecting and disconnecting them."

This invention consists "in using independent axles for each wheel, supported in suitable bearings depending from the carriage, whereby carriages will be enabled to turn round sharp curves with safety," the invention also connecting "each carriage to that preceding and following it by a solid continuation from the frame of one carriage in the shape of a tongue which fits into a groove or like contrivance carried on from the frame of the next carriage, a pin holding the tongue in the groove. This pin may be worked by a lever, so that when required it can be easily lifted and the disconnection effected. The tongue is rounded so as to permit of lateral play in the connection." When it is desired to liberate the engine alone from the train "the same lever which draws out the pin opens steam into a steam break, and shuts it off from the cylinders."

[Printed, 4d. No Drawings.]

A.D. 1853, March 7.—N° 574.

DODDS, THOMAS WEATHERBURN.—"Improvements in the manufacture of wheels and axles."

This invention relates to the construction of wheels and axles suitable for railway as well as other purposes. In making these improved wheels the malleable iron, or other raw material for the tyres, is primarily rolled out into long strips or bars, and these are then "coiled up into a helix or volute, and the folds or contact surfaces are rolled or hammered together at a welding heat for the thorough incorporation of the metallic layers; so that in this way the thickness or transverse section of the tyre is welded into a homogeneous mass throughout, instead of having merely a single weld at one point of the circle." The tyres are provided with inner flanges for the reception of the outer ends of the spokes of the wheels, and the naves are of "conical shape," the inner

ends of the spokes or arms being correspondingly bevelled, "so that when the latter are laid round the nave the cone is drawn up laterally by means of a plate on the wheel face, fitted with adjusting bolts, and the cone action then forces out all the arms or wheel spokes in a radial direction, bringing their outer ends to bear hard up against the interior surface of the tyre, and binding the whole wheel into a solid mass." The spokes may be of any suitable material, and may be so arranged as to produce a wheel "either solid, or nearly so, or open spoked." When wood is used for the spokes it is first subjected to the action of the vapour of boiling tar or bitumen, or boiled in a mixture of red lead and bitumen, as a means of preserving such wood from decay. "In fagotting up the improved axles the separate pieces out of which the required solid axle is to be produced are individually rolled or shaped with a species of duplex or other incline of a like character, so that when the pieces are laid together they dovetail or combine with each other in such manner that when rolled or laid under the hammer the rolling or hammer action forcibly combines all the contiguous or contact surfaces together, and effects a good metallic binding down to the centre of the incorporated mass." This is the system to be followed in the manufacture of solid axles, but hollow axles are made in the same manner, modified only as regards the leaving a tubular centre in the mass."

Various modifications of the invention are described, the details including a mode of retaining the folds or coils of tyre bars together by the use of an external flanged or boxed piece, and also a mode of manufacturing tyres from bars coiled up so as to furnish a continuous welding surface throughout the length of the coil, the contiguous surfaces of the folds being held together by dovetails or inclines.

[Printed, 10d. Drawings.]

A.D. 1853, March 10.—N<sup>o</sup> 615.

MYERS, EMANUEL.—(*Provisional protection only.*)—"Improvements in preventing railway engines and carriages running off the rails."

In this invention a stout iron bar is attached to the under side, and at each side of a railway engine or carriage, the lower end of this bar, which is called a "safety bar," being bent "so as to travel in the web of an ordinary rail, or in a suitable recess



"made by the overlapping of the top of a rail," the effect of this arrangement being to prevent the engine or carriage "from jumping or otherwise leaving the rail."

[Printed, 4d. No Drawings.]

A.D. 1853, March 22.—N° 701. (\* \*)

JOHNSON, WILLIAM.—(*A communication.*)—Shaping iron.

Describes machinery for rolling iron into railway wheels and other forms. A table is made to revolve horizontally upon a set of conical bearing rollers, and has a central recess to receive a shaping die for the lower side of the wheel to be rolled; its surface corresponds with a face of the wheel, and has a central pin standing up to save an axle hole in the boss. The mass of iron to be made into a wheel is laid on the die, and squeezed on its upper surface by a pair of horizontal rollers, revolving in opposite directions, to form the opposite face of the wheel, the two rollers of this pair being counterparts of each other. The apparatus being in motion, the combined effect of rollers and die shapes the two faces of the wheel, and the circumferential pressure of vertical rollers shapes the tyre face, and a finished wheel is produced by one operation.

2. Describes some modifications of the preceding apparatus; the circumferential shaping rollers may be dispensed with by forcing the tyre surface into an annular recess, and the table may be omitted by disposing three or more horizontal rollers above and below the metal to be rolled.

3. Applies the machine to the shaping of malleable metals into articles having a circular contour, wheel tyres, railway wheels, railway bars, cylinder and valve covers, boiler ends, flat plates, discs, and cones.

[Printed, 6d. Drawing.]

A.D. 1853, March 22.—N° 704.

HENSON, HENRY HENSON.—(*Provisional protection only.*)—

"An improvement or improvements in buffers."

This invention relates to buffers in which no buffer rods are employed, but which consist of a case or cylinder bolted to the carriage or waggon, and containing a volute or other spring, or alternate layers of caoutchouc and metal acting as such, and also a cast or wrought-iron hollow piston or plunger, having at the

outer end a buffer head. The invention consists in making the inner end of the plunger "exactly open." The volute or other spring is placed upon a plate or disc secured to the sole or end piece of the under framing of the carriage, or to a block of suitable material arranged for the purpose. The disc "is of rather less diameter than the inside of the hollow plunger, over which disc and spring thereon the plunger is free to work, and when the buffer is acted upon the open end of the plunger is caused to enter into an annular groove cut in the under-framing of the carriage, or in a block fixed thereon."

"The spring and plunger are kept in place by means of a strong iron bolt passing through the buffer spring and plunger, and secured on the inside of the under-framing."

"In all cases the hollow buffer plunger works over the spring."

[Printed, 4d. No Drawings.]

A.D. 1853, March 23.—N<sup>o</sup> 708.

**BOYLE, BERNARD.**—"A centripetal flange."

This invention consists "of the addition to the present flange of a smaller flange or rim" of the same or other material as that of which the wheel is composed, the additional flange in fact being added to the ordinary flange, so as to increase the depth of the latter. This additional flange may be applied in different forms, the patentee recommending gun metal as the material for its composition when "added to old wheels," although he apparently intends that new wheels shall have the additional flange formed with and of the same material as the rest of the wheel. The object of the invention is to afford additional security against wheels leaving the rails.

[Printed, 8d. Drawings.]

A.D. 1853, March 24.—N<sup>o</sup> 723. (\* \*)

**WALKER, ROBERT.**—"Improvements in working and increasing the safety of railways."

To prevent collisions and accidents a double line of signal cord is laid down in the manner followed at present (1853) in certain lengths, say  $\frac{1}{2}$  or  $\frac{1}{4}$  mile each, one length overlapping its neighbour length. At certain distances these cord lines are fitted with detents or stop levers, arranged so that on pulling a cord they may be elevated above or depressed beneath the railway. To prevent

a train running into another train in advance on the same line, the signal cord is slightly drawn forward, when the detent lever, which may be at a considerable distance in the rear, will be raised so as to come in contact with a stop on the engine of the advancing train: this stop is connected with a regulator valve, which when moved shuts off the steam, and the train stands still.

The lengths of the cords may terminate at the same point instead of overlapping; the same movement may put down the breaks; danger and other signals may be attached to them at intervals; they may be made self-acting; instead of lines of cord, "adjustable catches" may be placed at certain intervals, which the engine-man can run to, and set up a catch as required; or each train may carry a "catch piece" which the guard can lay down on the line; so that a catch on the train coming behind may come in contact with the stop, and prevent a possible collision.

[Printed, &c. Drawing.]

A.D. 1853, March 26.—No 727.

PRINCE, ALEXANDER.—(*A communication.*)—"Improvements in carriages."

This invention relates to those railway carriages in which the passengers, or a part of them, "sit sideways," and consists in the first place in constructing them "with two rows of seats placed close together and back to back along the middle of the body, and fitted with padded or elastic partitions, so that each passenger shall have a separate seat, with padded or elastic sides for leaning against, and as a guard, or for affording protection in case of accident, the two rows extending either the entire length from end to end of the body, so as to form it into separate longitudinal compartments, or else extending part or parts only of such entire length, so as to leave space for the passengers to pass from a longitudinal compartment on either side to the opposite compartment, through or along a transverse passage at the middle or at one end or both ends, with the doors at the sides or at both ends, or at the sides and ends."

Secondly, "in constructing the bodies of railway carriages, made as above set forth, with doors at the corners or angles, and with or without exterior platforms at the ends, so as to allow the passengers to pass from one longitudinal compartment

“ outside or round the end of the carriage and into the opposite compartment, or from one carriage to another.”

‘Thirdly, in constructing the bodies of railway carriages “ with separate side seats, and with protecting guards or partitions arranged or disposed on one or both sides of transverse passages between opposite doors.”

[Printed, 1s. Drawings.]

A.D. 1853, March 26.—N<sup>o</sup> 729. (\* \*)

DE BERGUE, CHARLES.—(*Provisional protection refused.*)—

“ Improvements in railway carriages.” These are, first, “ A mode or modes of constructing the under frame or under carriage with an additional framing or apparatus for carrying the side or bearing springs, and so holding the axle boxes and axles as, whilst allowing them to have the necessary play or movement, to diminish the vibrations and the shocks to which carriages, as ordinarily constructed, are more or less liable.” Second, “ A mode or modes of constructing vulcanized india-rubber side or bearing springs for railway carriages, so that grease or other lubricating material may be applied to the metal parts without running into contact with the india-rubber.”

[Printed, 4d. No Drawings.]

A.D. 1853, March 29.—N<sup>o</sup> 745.

HILL, THOMAS.—(*A communication.*)—“ Certain improvements in springs, and also in the modes of their application to railway engines and carriages.”

This invention consists “ of a spring or springs for railway and other carriages, and in certain modes of applying the same thereto.” These springs are formed “ by laying together a number of plates of steel or other metal, the ends of which are clipped or held together by means of buckles, rivets, or buttons; or the ends may be welded or soldered together.” When the plates have been fastened together at the ends by either of the modes above-mentioned they are beaten up into a serpentine form, and are variously applied, in some cases being used as bearing springs, and in others as buffer springs. In the latter case the arrangement may be such that “ both buffers act upon the same spring,” or the buffer bars may be shortened, and each

buffer act upon a separate spring. The springs are held in their places by means of iron plates with "double right-angle flanges," such flanges forming grooves by means of which the bows of the springs are maintained in a vertical position, and when pressure is applied to the buffers they act upon the springs through the medium of bars which run or are moveable in sockets. In the case of bearing springs, such springs are formed in two parts, "bolted or rivetted together at the ends, and fastened to the axle-box at bottom, and to the carriage frame at top."

[Printed, 6d. Drawing.]

A.D. 1853, March 29.—No 746.

NEWTON, SAMUEL. — "A self-acting friction break, to be applied to engines, carriages, and waggon used on railways."

"This invention is meant to supply to each carriage in a train a self-acting means of sledging or stopping the revolution of each pair of wheels simultaneously, or nearly so, throughout the train, the apparatus for producing such effect being always ready to come into action on the pull of the draw bar becoming slackened."

This effect "is accomplished by the adaptation and application to each axle of a friction wheel, over which is suspended or otherwise applied a common 'clamp break' (such as is ordinarily applied to cranes), in such a manner as to cause the break to span or embrace the whole, or nearly the whole, circumference of the friction wheel, against which the break is made to press by the action of a weighted lever. The tendency of this lever is to keep the break pressing against the friction wheel at all times, except when the weighted end of it is raised by the pull of the draw bar, so that the break is always ready to come into immediate operation, and the same friction wheel and break being applied to the axle of every carriage in the train, and the carriages being all suitably connected together, all the breaks may be drawn off their respective friction wheels by the draw bars, and all brought into action by slackening the speed of the engine simultaneously, or nearly so, throughout the train."

"The amount of force to be exerted by the weighted lever on each break may be varied, but it should be so regulated that the pull of the engine required to draw the carriage into motion

" may be more than sufficient to raise the lever, and draw the  
" break out of action."

The details of the invention may be variously modified.

[Printed, &c. Drawing.]

A.D. 1853, March 29.—N° 747.

CORLETT, HENRY LEE.—"Improvements in railway wag-  
" gons."

This invention relates to the construction of waggons in such manner that their contents may be readily discharged, the invention being particularly applicable to the formation of waggons suitable for distributing ballast upon railways, such waggons being provided with shoots opening in various directions, ballast thus being discharged upon the line at any required point while the wagon is in motion, or, if desired, stationary. Various modifications of the invention are described, in some cases the shoots being so contrived that the contents of the wagon may be discharged between the rails, while in other cases the discharge may be made outside such rails, the " flaps " or moveable portions of the waggons, if desired, constituting, when closed, a " flat floor."

[Printed, &c. Drawings.]

A.D. 1853, March 29.—N° 748. (\* \*)

HEATH, ROBERT.—"Improvements in railway breaks and  
" signals."

These improvements consist of the use of a lever and weight to press the breaks on to the wheels by a self-acting power, and when the guard turns his wheel it will only detach them. All the breaks in a train are to be connected by a chain, so that the guard by turning a handle winds a portion of chain on a barrel, and takes off all the breaks at the same time, and by letting off the chain from the barrel, allows them to press against the peripheries of the wheels. If any of the carriages by accident become unconnected the breaks apply themselves. Similar apparatus may be used to give a signal, and the application of the breaks will be a perfect signal between the guard and engine driver.

*Claims.*—1. " The method of working or applying single  
" breaks by means of a lever and weight, or levers and weights, to



“ the peripheries of carriage wheels, whether the same be used  
 “ on common roads or railways, and whether such wheels be  
 “ attached to coaches, &c. or any kind of vehicles in motion for  
 “ the purpose of conveying or transporting passengers, goods,  
 “ or merchandize.”

2. “ The method of connecting the said levers and weights  
 “ together so as to make them continuous, and to act upon a  
 “ number of such vehicles simultaneously, and to be under the  
 “ control of one person.”

[Printed, &c. Drawing.]

A.D. 1853, March 29.—N<sup>o</sup> 758.

HADDAN, JOHN COOPE.—(*Provisional protection only*).—“ Im-  
 “ provements in railway carriages.”

This invention consists in so arranging or disposing the seats  
 or parts of the seats of railway carriages as to prevent the occu-  
 pants from being thrown out of their places in case of a collision  
 arising ; and also in so constructing the bodies of such carriages,  
 and so disposing or arranging such seats, that the passengers  
 “ may be able to pass from side to side, or from end to end,  
 “ inside of the body, or by means of platforms outside of the  
 “ body, with suitable doorways formed in the sides or ends, or by  
 “ removing the angles at the corners so as to form doorways  
 “ partly at the sides and partly at the ends.”

Various modes of carrying out the invention may be adopted,  
 the seats being variously arranged according to circumstances,  
 and in some cases “ outer platforms ” being provided for the  
 access of passengers from one part of the carriage to another, and  
 doorways being arranged at the corners of the carriages in con-  
 junction with such platforms.

[Printed, &c. Drawing.]

A.D. 1853, April 1.—N<sup>o</sup> 780.

SAUNDERS, JONATHAN.—(*Provisional protection only*).—“ Im-  
 “ provements in the manufacture of railway tires.”

According to this invention a bar of iron is rolled so as to be  
 considerably thicker on one side than on the other, then cut into  
 lengths, and these lengths then passed through plain rolls, by  
 which means each piece is caused to assume the form of a seg-  
 ment of a circle. A number of these are then placed together,

" forming a circle with two or more layers, then heated in a furnace to a welding heat, and placed under a forge hammer and " worked into a solid ring," which is then " placed between two " rollers and reduced gradually to its intended form."

[Printed, 4d. No Drawings.]

A.D. 1853, April 12.—N<sup>o</sup> 871.

BLAKE, HENRY.—" Improvements in railway wheels."

This invention consists essentially in placing kamptulicon or some other similar substance between the ends of certain wood segments which compose the felloe of the wheel, a wrought-iron flanged tyre being then shrunk thereon. The wooden segments are placed around and within the recessed portion of a metallic rim or felloe, this being either cast along with the spokes and nave, or these portions being formed in any suitable manner. The object of the invention is to prevent the wooden segments from " becoming loose by contraction of the wood or other " causes," the elastic nature of the kamptulicon enabling it to constantly fill the spaces between the ends of the segments, although such spaces may vary from time to time in extent.

[Printed, 8d. Drawings.]

A.D. 1853, April 12.—N<sup>o</sup> 873.

TURIFF, ALEXANDER.—(*Provisional protection only.*)—" Improvements in the prevention of accidents on railways."

This invention relates to the so arranging railway brakes, " and " apparatus in connection with trains on railways, that the bad " effects of accidental collisions may be prevented by annihilating " the momentum of the carriages, and bringing the whole moving " mass to a dead stop. This is effected by so combining a wedge " action with an effective friction brake, such as an embracing " strap on the running wheels, that when the engine comes up " against any body in its path, the momentum of the train will " drive home the wedge, and put the brakes into the most powerful action. The actuating wedge may be connected with the " buffer movement, and the breaks may be arranged in any convenient and suitable manner, the special object of the improvements being the causing the momentum of the train to wedge " the retarding brakes into powerful frictional stopping action, so " that the whole train will be almost instantaneously stopped on

" the occurrence of any casualty which necessitates the bringing  
 " the brakes into play." The inventor mentions that such apparatus  
 " may be fitted to all classes of trains and rolling stock."

[Printed, 4d. No Drawings.]

A.D. 1853, April 12.—N° 880. (\* \*)

VERDIÉ, FRANÇOIS FELIX.—"Improvements in welding cast  
 " steel with iron," &c. The article on which cast steel is to be  
 welded is heated, covered with borax, and placed in a mould,  
 leaving a space round it of the size of which the coating of steel is  
 required to be. Fluid cast steel is run into the mould, and so  
 becomes attached to the article. Tyres of railway wheels may be  
 thus made. The articles, when so coated, should be finished by  
 hammering or rolling.

[Printed, 4d. No Drawings.]

A.D. 1853, April 14.—N° 898.

ROBINSON, MOSES.—" Certain improved means for preventing  
 " accidents on railways."

This invention consists, in the first place, in the employment  
 of a " parabolic wheel sleigh," which consists in effect of two large  
 cams fixed upon an axis which is placed parallel with one of the  
 axles of the engine, such cams being partially flanged, and upon  
 being let down upon the rails tending to lift the engine from them,  
 at the same time creating a large amount of friction between the  
 rails and those parts of the cams which are in contact with them.  
 The sleigh pieces are each furnished with heels and toe pieces, and  
 the sleigh thus formed may be controlled in its action by a  
 chain connected to it, and by means of which it may be raised  
 and lowered at pleasure, being retained in position when raised by  
 means of a catch. The particular form of the sleigh pieces may  
 be varied, and they may be used in combination with " sand  
 " pipes;" and if desired such sleighs may be applied to the  
 carriages of a train as well as to the engine, in addition to the  
 ordinary breaks of such carriages, and may be put into and out of  
 action by any means that may seem most desirable. When more  
 than one sleigh are applied to an engine or carriage such sleighs  
 may be applied in " counter action."

The invention includes the application of a " look-out box" in  
 front of the engine, from which a person may make signals, but

there is nothing in this part of the invention which requires notice here.

[Printed, 2d. Drawing.]

A.D. 1853, April 14.—N° 908.

GREEN, CHARLES, and NEWMAN, JAMES.—“Improvements  
“ in the manufacture of wheels.”

This invention consists “of rolling iron into plates, each plate  
“ having at one edge a suitable section for forming the tyre, the  
“ other portions of the plate forming the spokes or disc and centre  
“ parts of a wheel. In using such plates portions are cut out,  
“ either so as to leave spaces between the spokes, or that the  
“ parts may come together and form a close or disc wheel.”

These plates are cut and bent in different forms, and in some cases they are so bent as to constitute a wheel with spokes, while in other cases they are made to compose a wheel with a solid or continuous disc. Various modes of carrying out the invention are described, reference being made to the Specification of a patent granted to the present patentees on the 28th of March, 1849.

[Printed, 10d. Drawings.]

A.D. 1853, April 25.—N° 988.

HOOLE, HENRY ELLIOT.—(*Provisional protection only.*)—“A  
“ self-acting speed regulator and safety break for railway  
“ carriages.”

According to this invention certain horizontal rods, capable of sliding backwards and forwards, are mounted in bearings connected to the framing of the carriage, there being at one end of each of these rods a concave block, and at the other a small head resembling the head of a buffer, these heads being immediately behind the main buffer heads of the carriage, and the result being that on such buffer heads being moved, as in the case of a collision or obstruction being purposely raised to the progress of the carriage by slackening the speed of the engine, the sliding rods are also moved and press the concave blocks connected to them against the carriage wheels, such blocks then acting as breaks.

The heads of the sliding rods are connected to the buffers by “hinge-links,” in order “to admit of the necessary vibration.”

[Printed, 6d. Drawing.]

A.D. 1853, April 25.—N° 990.

CHATTERTON, JOHN.—“An improvement or improvements in  
“ covers for wagons, carts, and other vehicles.”

This invention consists “in making the semicylindrical or  
“ other shaped covers employed for covering wagons, carts, and  
“ other vehicles, in two or more parts, by dividing the said  
“ covers transversely, and making the said parts of slightly diffe-  
“ rent sizes, so that they may slide one within the other, after  
“ the manner of the tubes of a telescope.”

An arrangement is described in which the anterior half of a wagon is provided with a fixed cover of semicylindrical form, the posterior half having a similar cover, but of larger radius, and provided with rollers which rest on rods passing along the sides of the wagon, this portion of the cover thus being capable of sliding to and fro over the other. If desired, however, both parts of the cover may be moveable, the object of the invention being to facilitate the loading and unloading of the wagon by enabling a workman to uncover that part of the vehicle to which he wishes to have access.

Different modifications of the invention may be adopted, and the invention may be applied to railway trucks and other vehicles used in land carriage, and also to boats and other vehicles for water carriage.

[Printed, &c. Drawing.]

A.D. 1853, April 25.—N° 994.

JOHNSON, WILLIAM.—(*A communication.*)—“Improvements  
“ in the means of retarding and stopping railway trains.”

According to one modification of this invention either the tender or the first carriage of a railway train is provided at the hinder end with certain radial arms, the projecting ends of which can be raised or lowered at pleasure, or with horizontal bars which can be moved backwards and forwards, the outer ends of these arms or bars being intended to act when raised or moved forward upon a certain sliding bar with forked ends, or a sliding frame, which is mounted in suitable bearings below the body of the next carriage, and so cause longitudinal motion of that frame or bar, the result being that certain cross and other levers, links, rods, springs, and other adjuncts, the arrangement of which is somewhat complex, are made to force break blocks against the wheels

of this carriage, one break block acting upon each side of each wheel. The next and following carriages of the train are each provided with a sliding frame or bar and similar apparatus in connection with breaks, and thus the breaks of all these carriages are brought into simultaneous action by slackening the speed of the engine and tender and first carriage, the impetus of the other carriages of the train then causing the front of the sliding bar or frame of the second carriage to be thrust against the ends of the radial arms or bars first mentioned, such bar or frame being thus moved so as to bring the breaks of that carriage into action, and the bars of the hinder carriages being operated upon by that of the first.

The details of the invention may be variously modified, and such details include the use of springs or weights for restoring the sliding bars or frames to their first positions on the carriages resuming the proper distance from each other, these arrangements not being meant to supersede the use of the ordinary buffers, but only to come into action in case of extraordinary pressure upon the latter. In one arrangement, more especially adapted for coal or ballast waggons, the break consists merely of a kind of wedge, which is suspended from the sliding bar or frame by chains passing over pulleys, and jammed upwards between the wheels by the horizontal movement of such bar or frame. When it is desired that the breaks shall not be in any case called into action the ends of the radial arms or bars first mentioned are so moved as not to be in line with the sliding frames.

[Printed, &c. Drawing.]

A.D. 1853, May 21.—N<sup>o</sup> 1256.

BLAIR, JOHN.—“The application of steam power to the working  
“ of railway breaks.”

According to this invention the locomotive engine of a railway train has underneath the foot plate a cylinder, provided with a piston, and furnished with means by which steam may be admitted thereto from the boiler of the engine, there being at the outer end of the piston rod a broad flange or surface similar to a buffer head. Beneath the tender, and also beneath each carriage of the train, is a longitudinal shaft or rod, furnished at each end with a head similar to that of the piston, these shafts or rods being in line with the rod of the piston, and the latter with the shafts or rods forming in effect a continuous line of shafting below the



train when the engine, tender, and carriages composing the latter are placed in position. The shafts below the tender and carriages are all furnished with strong arms carrying break blocks, and the result of the whole arrangement is that the engine driver may at any time stop the train by shutting off the steam from the driving cylinders of the engine, and admitting it to that below the foot plate, the piston of the latter then being so acted upon by the steam as to move the line of shafts below the tender and carriages, and press the break blocks carried by the arms attached to them against the wheels of such tender and carriages.

[Printed, 4d. No Drawings.]

A.D. 1853, May 25.—N° 1283.

HALL, SAMUEL SANDERSON.—(*A communication.*)—"Improvements in the means of preventing railway carriages running off the rails."

In this invention a horizontal bar is so fixed below the spring of a railway carriage, and above the axle box, as to project some distance in front of the latter, the projecting end of this bar supporting a vertical bar, at the lower end of which is a piece of metal so arranged as to slide inside the rail, the lower edge of this piece of metal projecting downwards lower than the flange of the carriage wheel, and being rounded on the inner part of the front end; this rounded portion serving so to direct the carriage, in case of the ends of the rails not being exactly in line, as to prevent the wheel from coming in contact with a projecting end, and so being thrown off the rail. The vertical bar is maintained in due position by stay rods, the upper end of the bar being screwed, and entering a "screw box," means being thus afforded of regulating the height of the sliding piece, the latter being moreover furnished with a piece so contrived as to cleanse the surface of the rails and remove obstructions therefrom. The patentee mentions "an important feature" of the invention as consisting in so connecting the horizontal bar to the carriage "that it does not partake of the vertical movement of the body thereof," this of course preventing vertical oscillation of the vertical bar and sliding piece.

[Printed, 10d. Drawings.]

A.D. 1853, May 26.—N° 1292.

RACSTER, WILLIAM.—(*Provisional protection only.*)—"Central-action buffers and spring guides for traversing rods."

"The buffers are attached to buffer rods, long enough to reach to some distance behind the centre of gravity of the carriage. These buffer rods are either connected together by cross rods with swivel joints, with a motion like that of Roberval's balance, or are formed into a rigid frame. To the center of the hinder part of this frame, whether with swivel joints or rigid, is attached the central buffer spring rod, the spring of which is placed behind the centre of gravity of the carriage."

The inventor states that by these arrangements "the motion of the carriage will be rendered equable and steady," and "any tendency to wobbling" be counteracted.

[Printed, 4d. No Drawings.]

A.D. 1853, May 26.—N<sup>o</sup> 1294.

WARCUP, WILLIAM.—"Improvements in the construction of springs for carriages and similar purposes."

This invention relates to the arrangement and construction of railway carriage, buffer, draw, and other springs," by "the combination of V or double open angular spring blades, the whole being contained in a box or outer shell cover. As applied for the bearing spring of a railway carriage a deep but narrow metal box serves to contain the springs, and forms the axle box for the journals. The box is retained in its position by guard irons, bolted in the usual way to the sides of the truck or carriage. The springs are composed of series of plates bent into the V form, and are coupled together by joint pieces, and a pin and roller inserted into the bend of the plates to form a more regular action."

Various modifications of the invention are described. In some cases a "single" V spring is employed alone, while in others a number are combined, different modes of effecting the combination being set forth. The springs are for the most part formed of one piece of metal bent into the form of the letter V, but in some cases they are formed of two pieces, riveted together. The invention includes an arrangement in which a spring box is fitted with "side springs" of V form, "which bear against the inner sides of the guard irons, and act as buffers to each distinct carriage wheel," the box being provided with bearing springs composed of any suitable combination of similar springs. Such spring boxes may be filled up between the springs with oil or other lubricating material, which may serve also for lubricating the axles.

[Printed, 8d. Drawing.]

A.D. 1853, May 26.—N° 1296.

SAUNDERS, JONATHAN.—(*Provisional protection only.*)—"Improvements in the manufacture of railway and other wheel tyres."

This invention consists in mixing with iron, while in a melted state in a puddling furnace, a composition formed by combining nine parts of muriatic with one of sulphuric acid, and adding to each part or pound of the mixture so produced twenty parts or pounds of muriate of soda, more or less, according to the quality of the metal, the inventor apparently intending that twenty pounds of the muriate of soda with one pound of the combined acids shall be mixed with about four hundred weight of iron. He states, however, that he does not confine himself exactly to the proportions stated, although he has found those "to be best suited for steel iron," the latter being, after the admixture, made into balls, and worked in the ordinary way. He further states that he does not claim the "admixture and working" described for the purpose of "making iron to be converted into steel," such being "partially known and worked," but that what he claims is, "the application of it to the manufacture of railway and other wheel tyre."

This invention is noticed here on account of the inventor having specially claimed it with reference to the tyres of railway and other wheels, but it is not intended that all inventions of this class shall be so noticed, such inventions belonging more properly to the series relating to the manufacture of iron and steel.

[Printed, 4d. No. Drawings.]

A.D. 1853, May 27.—N° 1305. (\* \*)

ARNOUX, CLAUDE. — (*Provisional protection only.*)—Locomotive.

A pair of driving wheels are fixed to the same axle, and the cylinders are placed on either side of the splinter bar. The front and back parts of the locomotive are supported by converging axles, each furnished with directing wheels. Two coupled pairs of motive wheels may be fixed to the same axle. The motive wheels are made without any rim. To avoid the slipping of one of the wheels on curves when only one pair is used, the two wheels are fixed to two half axles, each set in motion by a pair of small cylinders, and a second pair of half axles are used when two pairs of coupled wheels are employed.

Refers to a grant of Letters Patent, dated June 24, A.D. 1852, for various arrangements of locomotive wheels enabling the carriage to surmount curves.

[Printed, 6d. No Drawings.]

A.D. 1853, June 4.—No 1372.

LENZ, CARL FEDOR.—(*Partly a communication.*)—(*Provisional protection only.*)—"A mechanism of a new construction, having "as its end the prevention of the loss of force caused till now by "friction, to diminish the oiling till now necessary, and to prevent the heating of the axletrees in revolving."

According to this invention there are fixed upon an axle two "conical wheels," placed at some distance apart, and with the conical faces towards each other, these wheels in fact resembling bevil wheels without teeth. Upon or against these rest two other similar wheels, the latter inclining towards and touching each other, and being placed upon pivots on which they are capable of rotating, these pivots being connected to what the patentee terms a "counterpoise," but which is apparently a bearing for the support of the body of a vehicle, a part of this counterpoise being, however, so formed as to be parallel with the upper parts of the wheels on the pivots, and there being interposed between those wheels and the counterpoise antifriction balls working in holes in certain plates which keep them at a proper distance asunder, such balls being prevented, moreover, from being thrown out from the centres of motion of the wheels by the upper parts of the latter being dished or hollowed in a concave form. The result of the whole arrangement is that on the rotation of the axle the wheels thereon cause rotation of those on the pivots, the balls between the latter and the counterpoise or bearer also rotating, and the axle and bearing being subjected to less friction than would take place if the bearing rested directly upon the axle.

Different modifications of the invention are described, in some cases the wheels on the pivots working horizontally, instead of being in an inclined position, while in other cases wheels mounted on pivots being placed both above, before, and behind those on the axle.

The invention may be applied "to all carriages employed on "rail as well as other roads," as also to "hand barrows used in "mines," to steam engines, mills, and axles in general.

[Printed, 6d. Drawing.]

A.D. 1853, June 6.—N<sup>o</sup> 1393.

WIGLESWORTH, HENRY.—(*Provisional protection only.*)—  
"Improvements in connecting together or coupling railway car-  
riages."

This invention relates to means of preventing the swinging of carriages from side to side by the application of a system of "cross connections," attached to the ordinary traction bar or other means of joining the carriages.

To each traction bar (which is by preference arranged so as "to yield easily from its spring") are affixed the ends of two chains or other flexible connections, "each of which thence passes backwards (or towards the centre of the carriage) to a guide pulley, over which it passes and returns to another guide pulley placed at the same end of the carriage as the hook to the traction bar or rod of which these flexible connections are affixed." The pulleys are near the sides of the carriage, and the flexible connections pass therefrom to the ends of crossed rods, which by means of other chains or flexible connections are likewise united with the traction bar of the next carriage, and so on throughout the train. The cross rods are connected at their outer ends by other rods which prevent them from rubbing upon each other, such other rods being jointed so as not to prevent the cross rods from adapting themselves to the varying positions and motions of the carriages; and one of each pair of cross rods may, moreover, be furnished with a slot through which its fellow rod can be passed.

[Printed, 4d. No Drawings.]

A.D. 1853, June 9.—N<sup>o</sup> 1405.

BOTT, GEORGE, and RUSHTON, WILLIAM.—(*Provisional protection only.*)—"A new or improved method of preventing collisions on railways."

This invention "consists of an apparatus placed near the rails of a railway, whereby, after the passage of a train, the passage of a second or succeeding train is prevented within a given distance of the first by the said apparatus shutting off the steam of the second or succeeding train."

The details of the invention may be variously modified, the "principle" of the invention being "that a locomotive in passing over one portion of the line is made to move an arm or lever



" into such a position that if a second or succeeding locomotive  
" comes up before the first train has proceeded so far as to bring  
" back the said arm or lever into the position it had before the  
" first train passed, that the said arm or lever shall turn off the  
" steam of the second or succeeding locomotive, and thus prevent  
" collision," the result being "that no train can follow another  
" within the distance arranged without the steam of the latter  
" being shut off."

[Printed, &c. Drawing.]

A.D. 1853, June 14.—N° 1437.

CRAIG, WILLIAM G.—"Improvements in axle boxes, guides,  
" and bearings of locomotive engines and carriages, parts of  
" which improvements are applicable to the bushes and bearings  
" of machinery."

The first part of this invention consists in casting upon the upper part of an axle box a flange, having therein an annular recess or groove, this adapting the axle box for the reception of springs such as those known as Coleman's Patent.

Another part of the invention consists in the use of "spring coverings as a substitute for and in place of the ordinary horn plates, and causing the same to act as guides to the axle boxes." Different modes of carrying out this part of the invention may be adopted, an arrangement being described in which the outer case of the bearing spring on the axle box is formed of two curved plates of wrought iron extending downwards, there being also placed between the flange of the axle box and the spring case a ring of india-rubber or other suitable material; the object of this being to prevent the admission of dust between the parts, as well as to lessen the liability to fracture in cases of severe concussion.

Another improvement consists in placing a metal box containing a cylindrical spring in front of the axle box, this spring pressing a certain T piece against the end of the axle, and preventing undue lateral motion of the latter. A similar effect may be produced by the employment of rollers, which are connected to plungers mounted in suitable cases bolted to the engine or carriage frame, and pressed against the tyres of the wheels by springs.

Another improvement relates to the bearings of axles, and consists in forming such bearings of hard wood instead of the metal



generally used, such wood being lined with the alloy known as "white metal," and this part of the invention being applicable to the bushes and bearings of machinery in general.

[Printed, 1s. 6d. Drawings.]

A.D. 1853, June 14.—N<sup>o</sup> 1440.

JOHNSON, JOHN HENRY.—(*A communication from Francis A. Stevens.*)—"Improvements in railway brakes."

This invention relates to so arranging the brakes of a railway train "that all the brakes on one carriage or all the brakes on an entire train of carriages may be simultaneously brought into action with a uniform or nearly uniform pressure throughout the series by means of a single operation."

Brake blocks are suspended on each side of each wheel by means of levers which are connected by links and cross bars, and also to certain "draw rods" which being acted upon cause the breaks to be pressed against the wheels. These draw rods are so arranged as to be actuated from either end of the carriage. The draw rods may be acted upon by any suitable mechanism, and the arrangements are such that the apparatus may either be caused to act upon the breaks of a single carriage or upon those of all the carriages of a train simultaneously, one part of the invention being especially set forth as consisting of arrangements by which "the frictional pressure of each brake against the periphery of the wheel is obtained by the reactionary resistance of the brakes of the adjacent wheels, communicated through a system of levers."

[Printed, 6d. Drawing.]

A.D. 1853, June 15.—N<sup>o</sup> 1454.

PAYNE, JOHN JEREMIAH.—(*Provisional protection only.*)—"Certain improvements in axles."

This invention consists in a new mode of arranging and disposing the axles of railway and other carriages, "so as to afford to such parts greater security than hitherto, and at the same time to allow the wheels to turn freely therewith, and for each wheel of a pair of wheels to have liberty of distinct and separate rotary movement."

The inventor states, in the first place, that the invention consists, firstly, "in the use and application of short axles to carriages

" used on common roads ; and, secondly, in making such said  
" axles, when applied to railway carriages, as long as possible, so  
" as to render such parts less liable to wear and break than when  
" made short, as hitherto."

He then proceeds to describe a mode of applying axles to carriages, which axles extend nearly half way under the carriage and are connected thereto by "straps," which surround each axle near the ends and on each side of each wheel, the latter being attached to the bearing springs of the carriage, and the arrangement being such that "as the springs yield the central position of the axles  
" remains unaltered," the inventor concluding by stating that "it  
" is this mode of connecting axles to carriages that constitutes the  
" invention."

[Printed, &c. Drawing.]

A.D. 1853, June 16.—N<sup>o</sup> 1469.

ROOSEVELT, CLINTON. — " Reducing the friction of the  
" journals of railway and other carriages," the invention being  
also "applicable to the journals of machinery."

This invention consists "in the arrangement and construction  
" of anti-friction rollers around a shaft or journal in a double  
" row." The journal may be of any suitable size, and has placed  
around it, in the first place, a number of short cylindrical rollers,  
outside of which again is a second row or series, each roller of the  
latter bearing upon two of the inner ones, and the outer row being  
surrounded by a cylindrical box, which keeps the whole together.  
This box may be stationary, the journal revolving within it, "or  
" the journal or axle may be stationary and the box revolve,"  
and the ends of the box should be lined with leather saturated  
with oil, "to prevent wear." In order more effectually to retain  
the rollers in their places one set may have flanches at the ends,  
projecting over the ends of the others ; or "the axle ends may  
" have flanges screwed thereon," which will answer the same  
purpose.

[Printed, &c. Drawing.]

A.D. 1853, June 16.—N<sup>o</sup> 1473. (\* \*)

SOLOMON, SOLOMON, and MILLS, SAMUEL.—"Improve-  
" ments in axle boxes for locomotive engines, railway and other  
" carriages, applicable to the bearings of machinery."

1. Arranges friction rollers round carriage axles and shafts of machinery to reduce friction. The axle box is made of cast iron, and has two flanges cast on its inside, one at each end, which form two recesses or annular grooves, in which are placed a number of small short cylinders, made of steel, case-hardened iron, or gun metal, forming a ring round the axle. These friction rollers revolve on their own axes and round the axis of the wheel, and are kept in their places by a ring of metal having an external screw cut upon its periphery and screwed into each end of the box.

2. The journals may be conical; the friction rollers may have a journal at each end. Loose metal rings may rotate on their gudgeons as the rollers travel round the axle, and loose collars may be placed over them; and two or more sets of rollers may be arranged round the axle. An oil chamber is formed within the box from which they may be lubricated. 3. Shows an application of the rollers to the beam of a steam engine; and they may be used for diminishing the friction and wear between bearings and moving parts of shafts, axles, and other parts of machines.

[Printed, 8d. Drawings.]

A.D. 1853, June 22.—N<sup>o</sup> 1521.

NOONE, JOHN HENRY.—“An improved method of stopping railway trains and preventing railway accidents.”

According to this invention the patentee proposes “to have two metal bars three inches square, the length to be regulated according to the distance of the front and hind wheels; one bar to be firmly fixed to the under framework of the carriage, with a square hole made exactly under the centre of each wheel; another bar three inches deep and one inch thick, with an inclined plane top and bottom; the inclined plane to be reversed and cast or otherwise made within one inch of each end of the bar, the length to be regulated by the same rule as the first bar named, the inclined planes to be an incline of three inches, and about three inches wide and nine inches long; the said bar works or slides on the first bar named; a core is cast or otherwise made in the inclined planes to allow a bolt (which is attached to the boxes of the wheels) to work up the inclined planes; such bolts to have nuts and collars so arranged that the wheels may have a proper bearing

" when in their right position. The second bar has a spur or projection so arranged that the front buffer rods and levers when struck by a sufficient force strike the spur or projection, and carry the bolt (attached to the wheels) three inches up the incline planes." The patentee proposes also to have small wheels or rests, " of the same width of tire, with flange, &c., and one-third the diameter of the ordinary wheels; the small wheels to have a racket wheel on the outside, to which is fitted a stop or catch to prevent the wheels from revolving forward;" the small wheels or rests, whichever adopted, to be hung one inch and a half from the rails, so that as soon as the bolts attached to the ordinary wheels are driven up, as before mentioned, such small wheels or rests " fall on the rails, and the train is stopped. By means of other machinery, consisting of levers and connecting rods (which rods connect, when required, throughout the train of carriages), the guard, driver, or other person appointed can accomplish the same result as the buffer rods."

The result of these arrangements is that a railway train is stopped " by lifting the wheels off the rails," and allowing the carriages " to rest on other wheels or supports which have no motion forward."

[Printed, 8d. Drawing.]

A.D. 1853, June 27.—N<sup>o</sup> 1557.

FRENCH, GEORGE.—(*Letters Patent void for want of Final Specification.*)—" Improvements in axles or axletrees."

The object of this invention is so to construct the axles or axletrees of railway carriages that the wheels, when fastened thereon, may be allowed to turn independently of each other when required to do so; as, for instance, in passing round curves or into sidings. This object is effected by dividing the axle into two parts, or " half axles," and connecting them by flanges or collars. " The end of one half axle is bored out so as to form a socket, and the end of the other half axle has a pin formed thereon which fits into the socket of the other half axle," the flanges or collars and certain bolts securing the whole together.

[Printed, 4d. No Drawings.]

A.D. 1853, July 4.—N<sup>o</sup> 1594.

DE BERGUE, CHARLES.—(*Provisional protection only.*)—" Improvements in the manufacture of railway wheels."

These improvements "are applicable only to wheels made  
 " with ribbed or feathered tyres, and consist in manufacturing the  
 " frame or body of the wheel (whether of cast-iron only, or of  
 " cast and wrought iron combined) in the form of a solid or per-  
 " forated plate or disc (either in one or more part or parts, and  
 " either with or without strengthening ribs or feathers), and sup-  
 " porting or securing the tyre thereon or thereto by fitting the  
 " frame or body to one side of the rib or feather of the tyre, and  
 " rivetting or bolting the same thereto."

" Or by fitting the frame or body to the inner or under side of  
 " the tyre and the side of the rib or feather, and rivetting or bolt-  
 " ing the same thereto."

" Or by fitting the frame or body to the inner or under side of  
 " the tyre, and to the edge and the side of the rib or feather, and  
 " rivetting or bolting the same thereto."

" Or by fitting the frame or body to the edge and the side of  
 " the rib or feather, and rivetting or bolting the same thereto."

The details of the invention may be variously modified.

[Printed, &c. Drawing.]

A.D. 1853, July 5.--N<sup>o</sup> 1599.

DAVIS, MARCUS.—"Improvements in carriages, scaffoldings,  
 " and ladders, which scaffoldings and ladders are used as  
 " carriages."

One part of this invention consists in making axles for carriages  
 tubular, and fixing at each end of such an axle a ball or sphere  
 of metal or wood, "as bearings for the wheels to be run on."  
 When great strength is required in the axle there are placed  
 inside it thin pieces of metal, such as are used for washers, these  
 being, if desirable, placed upon a wire or bar, with pieces of wood  
 between them by which they are kept at a proper distance apart,  
 nuts being placed at each end of such wire or bar. Or a slip of  
 flat bar or hoop iron may be passed into the axle, for the purpose  
 of "making a thin light tube capable of sustaining great hori-  
 " zontal pressure." Or a narrow strip of iron may have notches  
 cut therein, and notched washers be placed thereon, the edges of  
 the iron being presented to that part of the tube which is ex-  
 pected to sustain the greatest pressure. For monkeys or trucks,  
 or "merchandise carriages," axles are formed of either square or  
 round iron, and either tubular or solid, "and either terminating cy-

"lindrically for the wheels to run on, or spherically, as previously "described." The wheels of such vehicles are formed of metal or wood, and in two halves, there being a hemispherical cavity in the centre of each half, and these cavities, when the two halves are bolted together, fitting upon the ball or sphere at the end of the axle. In each wheel, about midway between the centre and the circumference, is a groove or recess for the reception of oil, a passage leading from this groove or recess to the axle, and a piece of sponge or other straining material being placed in this passage for the purpose of clarifying the oil used, such oil being poured into the groove or recess through a hole formed from the outside of the wheel, such hole being provided with a suitable stopper. In the case of cylindrical axles the hemispherical recesses in the wheels may be partially filled with cork or india-rubber, or the wheels may have cylindrical holes through them. If the wheel be of wood, and meant to work upon the spherical axle end, the recess may be lined with metal, or if the wheel is to work upon a cylindrical axle it may be bushed with metal. The external parts of the two halves of the wheels are so recessed that when they are placed together they will firmly grasp between them an india-rubber tyre or ring, or a tyre or ring of any other material.

The invention embraces a multitude of details, including the use of spheres having flanges or collars around them which work in grooves in the wheels, and so cause them to "revolve in the "same plane as the axle;" or a bearing parallel with and revolving in the same plane as the axle may be used for that purpose, wheels being formed in two or more parts, as most convenient. Or a wheel may be formed in one piece only, and various modes of connecting the india-rubber or other tyre thereto be adopted. Wheels having hemispherical recesses on each outer side of the nave are also described, such wheels being useful for "barrows "and one-wheel carriages." Wheels having spokes of "wrought "iron or round gas tube" are also described, and axles having more than one sphere or ball at the end upon which the wheel works. Angle iron is also mentioned as being used in forming the outer circles of wheels, a groove in the periphery of such a wheel being in some cases filled with asphalt or cork, a layer of india-rubber being outside this. Instead of the ordinary perch bolt of a carriage for common roads, a ball-and-socket motion is applied, different arrangements of this part of the invention being described.



The use of an "arched serpentine form" of tubing in the construction of the framework of carriages of various kinds is also set forth, as also the use of angle iron for the same purpose. Likewise the construction of a wheel the outer circle of which is of wrought T-iron, the spokes being composed of cylindrical tubes which are fastened "to the lip or under part of the T." And ladders and scaffolding are also described as being composed of tubing, a box having grooved wheels being arranged in some cases to travel up and down such a ladder for the purpose of carrying building materials, and the arrangements being such that one portion of such a ladder or scaffold may have wheels attached thereto and be used as a carriage for conveying such materials, "or other portions of the scaffolding and ladders."

[Printed, 10d. Drawings.]

A.D. 1853, July 18.—N° 1708.

FONTAINE MOREAU, PETER ARMAND LE COMTE DE.—  
(*A communication.*)—"A new mode of equilibrating indefinitely  
"the weight of atmospheres."

This invention consists "in the combination of apparatus for  
"applying the elasticity of atmospheric air or other gases as a  
"spring or buffer to deaden shocks, such as those on railways."

The apparatus employed is composed essentially of a cylinder into which air is forced and compressed, such compressed air serving as a spring, and a piston being placed in the cylinder which will serve as a buffer, the air acting as the spring thereto. A mode of charging the cylinder with air is described in which the piston is removed, and a "prolongation" screwed to the open end of the cylinder, the piston being then adapted to the open end of the prolongation, and kept in position by a cap having an opening through it. Air is then forced by means of a pump through an opening in the side of the prolongation, and the piston is pushed back into the cylinder itself, and the parts gradually brought back into their first positions by the use of the open cap mentioned above, a certain closed cap, a nut, and other apparatus, the use of all of which is minutely described. Instead of air, gas may be used, if preferred.

[Printed, 1s. Drawings.]

A.D. 1853, July 20.—N° 1720.

DE ST. CHARLES, PHILIPPE POIRIER.—(*Provisional protection only.*)—"Improvements in stopping and starting vehicles."

This invention consists in "applying a break to the wheels, " which takes up the power or momentum of the vehicle in " motion, and offers an opposition to its further progress, such " power being again given out and exerted in starting the vehicle," this object being effected "by placing pinions on the naves of " the wheels, which, when it is desired to stop, are thrown into " gear with racks," acting simultaneously "in the compression " of a number of strong springs," and opposing further rotation of the wheels, these springs being held in a compressed state during the stoppage of the carriage. When it is desired that the latter shall again move forward, the "gearing" of the racks and pinions is so changed that the springs are able to exert their force in assisting the carriage onwards, and by this means "the force " used to stop the vehicle is beneficially exerted in starting it " again." Other arrangements of apparatus may be employed for the purpose, and "weights substituted for springs, with a " similar effect."

[Printed, &c. No Drawings.]

A.D. 1853, July 22.—N° 1733.

**SPENCER, GEORGE.**—"Improvements in springs for carriages."

According to this invention springs suitable for the buffer, bearing, and draw springs of railway carriages are formed by the use of a number of india-rubber rings, of a "double conical " shape," or resembling the frustums of two cones united by their bases, the rings being placed upon a central rod in contact with each other, and each being surrounded by a metallic ring or shut cylinder, which is connected to it by pins, or by a rib inside the ring of metal which enters into the india-rubber. On the india-rubber rings being compressed they are prevented from swelling out at their greatest diameter by the metallic rings, the smaller portions of the india-rubber rings, however, bulging upwards into the outer portions of such metallic rings, but returning to their first positions on the compression ceasing. In applying these springs as buffer springs they are placed upon portions of the buffer rods, below the carriages, which are of smaller diameter than the rods, and between washers on the buffer rods, which move therewith, and other washers fixed to the framing of the carriages. For outside buffers both india-rubber and metallic rings are placed within a cylinder of wood or metal. In other

cases the rings are mounted upon suitable spindles, connected with apparatus of such character as the intended purpose of the spring may require, and springs may thus be contrived which are applicable not only for railway purposes, but also to carriages for common roads.

[Printed, 8d. Drawings.]

A.D. 1853, July 23.—N<sup>o</sup> 1737.

LALANDE, AUGUSTE BUISSON.—(*Provisional protection only.*)

—"Certain improved means for preventing accidents on railways."

According to this invention each carriage of a train is provided with a horizontal bar which extends lengthwise under the framework, and is connected by diagonal bars to a cross bar, to the ends of which breaks are affixed. The horizontal rod of one carriage is connected to that of the carriages before and behind it by means of "screw nuts," and may also be "hinged together at suitable distances by means of pins or hinges so as to allow of curvature." It is apparently meant that these rods, &c. shall be moved simultaneously so as to press the breaks upon the wheels when requisite, but no indication is given of any mode of accomplishing such movement.

[Printed, 6d. Drawing.]

A.D. 1853, July 26.—N<sup>o</sup> 1757.

BANKS, THOMAS, and BANKS, HENRY.—"Improvements in apparatus for retarding and stopping railway trains, which improvements are also applicable to vehicles travelling on common roads."

In the first part of this invention each axle of the tender or guard's van of a train is provided with three discs of metal, placed near together, but having between them discs of wood. Each central metal disc is loose upon the axle, and is connected to a bar passing longitudinally from one end of the tender or van to the other, these discs being thus prevented from revolving, while of the other metal discs those on one side of the central discs are fast upon the axles and revolve therewith, while those on the other side are capable of sliding to and fro upon the axles, being placed upon feathers in such axles. A second longitudinal bar or shaft has upon it arms or levers, the ends of which are capable of

acting upon the sliding discs, there being another lever also upon this shaft, the end of which is placed in connection with a nut upon a screw, and certain gearing by which the latter may be turned, the result of the arrangement being that on turning the screw in one direction the sliding discs are pressed against the others, friction being thus created between the surfaces of the different discs, and the motion of the train being retarded or stopped, the discs being again set free from each other by turning the screw in the opposite direction.

In another part of the invention similar arrangements of discs and longitudinal bars are applied to each carriage of the train, but are brought into action when requisite by means of springs connected to levers, being kept out of action until required to operate by eccentrics mounted upon shafts furnished with handles, the eccentrics bearing against other levers, and being moved in either direction by the handles so as to allow the discs to come into contact or to remove the pressure of the springs from them at pleasure; the arrangements being such that the eccentrics of all the carriages of the train may be moved simultaneously. The invention may be applied, if desired, to carriages for common roads.

[Printed, 1s. 2d. Drawings.]

A.D. 1853, August 2.—N<sup>o</sup> 1800.

**BOTHAMS, JOHN.**—(*Provisional protection only.*)—"Improve-  
ments in the manufacture of wheel tyres for locomotive engines  
and other carriages."

The object of this invention is "to obviate the weld or union  
of the metal across the tyre at any one point," and so reduce  
the liability of the tyre to breakage at the weld. To effect this  
the inventor takes a bar of suitable dimensions, and winds it "in  
the form of a helix of a sufficient breadth to form the tyre; it  
is then heated and welded together in a solid mass, and afterwards  
rolled or hammered of the proper size and shape for the pur-  
pose required."

"Instead of winding the iron in the form of a helix it may be  
wound in the form of an involute, or made of a series of hoops,  
either welded or otherwise, and placed together so that the  
joints do not coincide when the whole mass is welded together."

[Printed, 4d. No Drawings.]

A.D. 1853, AUGUST 2.—N° 1807. (\* \*)

RAYMOND, MEAD TERRY.—(*Provisional protection only.*)—

“Improvements in apparatus for retarding and stopping trains of carriages on railways.” The invention has for its object “the interposition of a carriage between the locomotive engine and the train of carriages, in order to carry breaks and apparatus acting by elasticity in such manner that the breaks will ordinarily be applied to the wheels when the train is at rest, and the breaks will only be removed when the locomotive engine has moved a determined distance in advance of the train, so that should the locomotive, after being in motion, be stopped, whether by accident or otherwise, the apparatus acting by elasticity will cause the breaks of the interposed carriage to be put on or brought into action, and retard the progress of the train, and bring it to rest, or nearly so, before it comes up to the locomotive engine; the rope, chain, or band by which the interposed carriage is connected to the locomotive engine will at the same time be wound or taken up by the apparatus acting by elasticity as the interposed carriage comes up to the locomotive engine.” For these purposes bands of vulcanized india-rubber are used both for putting on the breaks and for winding or taking up the band, cord, or chain which connects the train with the locomotive engine.”

[Printed, 4d. No Drawings.]

A.D. 1853, August 11.—N° 1868.

DEWSNUP, THOMAS.—“Improvements in obtaining motive power.”

This invention consists in the employment of caoutchouc, “or any composition of the same, as a means of obtaining power instead of springs,” and is mentioned as being applicable among other purposes “for applying or detaching the break blocks to railway carriages.” No particular mode of thus applying the invention is described, however, the only application of the invention specially set forth consisting in a mode of propelling a vehicle by the use of a number of strands of vulcanized india-rubber or other similar elastic material, which are each connected at one end to hooks carried by the framing of the vehicle, then passed round a guide pulley, and attached at the other end to one of two drums or rollers, which, being turned round, coil upon them portions of

the elastic strands, thus stretching such strands. The drums are separate, though in line with each other, but may be connected by means of certain ratchet wheels and catches, so as to act in unison, and when thus connected and set at liberty after the stretching of the strands, the elastic force of the latter causes them to rotate, and, through the medium of certain chain wheels and chains, to turn one of the axles of the vehicle, thus propelling the latter, the wheels being fast upon such axle. The turning of the drums in order to coil the strands upon them is effected by means of suitable gearing and a handle. The vehicle to which the invention is described as being applied is mounted upon two hinder wheels to which the power is applied, and a third wheel in front which also serves as a guide wheel, being capable of being turned into different positions by means of a handle.

The invention may be applied to time pieces, childrens' toys, and other articles, and might undoubtedly be applied, as mentioned, to the working of railway breaks.

[Printed, &c. Drawing.]

A.D. 1853, August 12.—N<sup>o</sup> 1887.

BROOMAN, RICHARD ARCHIBALD.—(*A communication.*)—"A method of producing castings in malleable iron."

This invention consists of "an improved method of preparing wrought iron so that it may be capable of being poured or cast into moulds for the production of malleable castings, or articles which shall have all the strength and qualities due to wrought iron." The invention is designed "chiefly for the manufacture of railway wheels, but is equally applicable to the production of other articles."

"The metal employed may be either scrap wrought iron, or bars or plates cut into small pieces, and the melting is to be performed in crucibles, such as are used for melting blister steel. The operator weighs out the iron in quantity proper for a charge in the crucible according to its size. He then mixes with the iron about one half of one per cent. of charcoal, by weight, or of any other suitable carbonaceous matter which will afford that proportion of carbon, and finally adds one per cent. of manganese and one per cent. of sal-ammoniac." These materials are to be placed in the crucible, "which is then to be covered, as the melting must be performed out of contact with



" the atmosphere. The crucible is then introduced into a proper  
" furnace, where a fire is raised, and a heat obtained sufficient to  
" reduce the iron to a melted mass, which temperature is at about  
" 15,000° Fahrenheit; this degree of heat must be maintained  
" for about three hours, when the material will be in a state fit  
" for pouring into the moulds."

" Railway carriage wheels formed of this material can be cast  
" with a chill, as in the case of common iron castings, and they  
" will moreover be malleable, so as to be capable of being treated  
" under the hammer in the forge." In the making of articles  
not requiring to be chilled they may be subjected to alterations  
in shape, or otherwise be treated as malleable wrought iron is  
usually worked. And articles may also be manufactured having  
part of their shape made in the moulds and their form completed  
by forging.

This invention belongs more properly to the series of Abridgments relating to the manufacture of iron and steel, but is included here on account of its being set forth in the Specification as being designed chiefly for the manufacture of railway wheels. Other inventions of the same class will be found in that series of Abridgments.

[Printed, 4d. No Drawings.]

A.D. 1853, August 22.—N° 1952.

STEVEN, JOHN.—" An improved axle-box for railway carriages  
" and wagons."

This invention consists, firstly, in constructing axle boxes  
" each in one single piece or mass, the body of the axle box being  
" cast or formed in one piece with its under cover, instead of being  
" in two separate pieces, as in the arrangement usually adopted  
" in such works," axle boxes thus formed not requiring " any  
" fitting of the under cap or other details."

Secondly, in forming axle boxes " with recesses or cavities on  
" the upper sides or tops thereof for the reception of the bearing  
" springs, the springs being secured at their central portions  
" within the recesses by means of strong buckles or clasps,  
" instead of uniting them to the boxes by means of the ordinary  
" ties or clips," the patentee stating that the weight of the vehicle  
is sufficient to keep the springs in their places in the box recesses,  
and that " the usual fastening details are quite unnecessary."

Thirdly, in forming the brass bearings and grease chambers of axle boxes in such manner that the brasses "extend upwards to the part containing the grease, cylindrical holes being provided for the passage for the passage of the grease to the rubbing surfaces," this arrangement keeping the brass "in immediate contact with the grease or lubricating matter."

[Printed, &c. Drawing.]

A.D. 1853, August 27.—N<sup>o</sup> 1991.

**STIRLING, JOHN DAVIE MORRIES.**—"Improvements in the manufacture of rails and parts of railways, and tyres of railway wheels."

This invention consists in "piling bars of iron rendered crystalline by means of tin, antimony, arsenic, or bismuth, with bars of other iron (combined or not with zinc), to give fibrous character to the interior and other parts of such compound bars, the crystalline iron coming to the wearing surfaces."

A mode of carrying out the invention is described in which outer plates of "Stirling's patent hardened iron," manufactured according to previous Letters Patent granted to the present patentee, are placed outside plates of more fibrous iron, the patent iron having been hardened by the use of tin, antimony, arsenic, or bismuth, as well understood. Bars rolled from such piles are intended for constructing the wing and point rails of railways, while for composing bars suitable for tyre-iron for railway wheels the piles are so arranged as to form one side of the bar of the hardened iron and the remainder of the more fibrous iron. The patentee mentions that he prefers to use for the more fibrous parts of each pile iron which has been rendered more fibrous by the use of zinc, as described by him under previous Patents, but that other fibrous iron may be used, and the piles variously arranged according to circumstances, piles intended for tyres having the bar or bars meant to form the wearing or flanged surface longer than the others.

The invention is noticed here on account of the patentee having set forth in the title that it is applicable in the construction of the tyres of railway wheels. It is not intended, however, that all inventions of this class shall be so noticed, such inventions belonging more properly to the series relating to the manufacture of iron and steel.

[Printed, &c. Drawing.]

A.D. 1853, September 5.—N<sup>o</sup> 2043.

SMALLEY, JOHN, and SMIRK, WASHINGTON.—“An improvement in railway carriage axles.”

This invention consists in employing “a separate axle for each wheel,” such axles, however, not extending from side to side of the carriage, but being “short axles which run in a double bearing,” and having “strengthening bosses on each side of the wheel.”

According to a drawing annexed to the Specification each axle extends to an equal distance on each side of the wheel placed upon it, a similar journal or bearing being formed at each end of the axle, and each journal working in a suitable axle box, the two boxes being connected by iron plates or frames, and so constituting what the patentees term a “double axle box,” and which is furnished with suitable slots and guard irons, there being also certain plates arranged at the ends of the journals by which the “play” of the axle can be regulated, and which plates can be removed and replaced as the parts wear. The strengthening bosses on each side of the wheel are meant not only to strengthen the axle, but also to sustain the wheel by forming butting flanges thereto. One of these bosses is forged upon the axle, and after the wheel has been placed upon such axle, with one side of the nave against the boss, a collar or ring is placed upon the axle in a heated state, and forms a boss on the other side of the nave.

The springs of the carriage may be placed upon the axle boxes, but the patentees recommend that a timber frame should first be mounted on the box, and the springs placed upon that frame, in order to reduce “the stroke of the wheels when going over crossings.” For lubricating the axles channels are so formed from the grease boxes as to “allow the grease to get to the centres of the journals.”

[Printed, 8d. Drawing.]

A.D. 1853, September 10.—N<sup>o</sup> 2101.

MARKS, JOSEPH, and HOWARTH, JOHN.—“Certain new and useful improvements in machinery or apparatus for operating the brakes of a train of railway carriages.”

According to the first part of this invention the brakes of a locomotive engine are suspended between the two main wheels on one side of the engine, but may if desirable be applied between

the main wheels on the other side also, the two brakes on either side being jointed together at their upper ends, and having between them a cam mounted upon a shaft, the journals of which are sustained by plates or bars so contrived as to have a slight longitudinal motion. The shaft on which the cam is fixed has upon it an arm or lever projecting upwards, and to this is connected a chain which passes to a windlass barrel, to which motion may be given by the engineer turning a hand wheel, and so putting in motion certain gearing connected with the windlass. The result of this is so to turn the cam as to force the brakes apart and press them against the wheels, and in case of the "rubbers" of the brakes not being of equal thickness the moveable bearings of the shaft carrying the cam will so adapt its position thereto that the pressure of each brake upon the wheel will nevertheless be equal. Connected to the windlass is a second chain, which through the medium of a spring is made at the same time to act upon a lever carried by the tender, and so bring the brakes of the tender into action likewise, these being arranged in connection with the levers as may seem most suitable. The joints of the brakes of the locomotive are sustained by a vertical rod passing through projections extending from the carriage frame, and supported by a helical spring, this arrangement enabling "the vertical movements of the carriage body to take place without creating any material diminution of the pressure of the brakes against the wheels." Springs are connected to the brakes which release them from the wheels on the movement of the cam being reversed, the spring mentioned above as being connected to the second chain on the windlass serving at the same time to release the brakes of the tender.

With reference to the brakes of the carriages of a train, the invention consists in providing each carriage with an apparatus of which the essential features are composed of a grooved windlass barrel mounted on a short vertical shaft, and provided with spiral springs which may be so wound up as to give the barrel a strong tendency to turn round in one direction, this being prevented, however, when the springs are so wound up by a ratchet wheel on the upper part of the shaft and a pawl which engages therewith. Chains passing from this windlass barrel are carried round a double fusee, mounted upon a second vertical shaft which extends downwards, and has connected to it a chain which is attached to a lever or rod provided with suitable apparatus for

bringing the brakes of the carriage into action upon the wheels. The fusee is not fixed upon the shaft, but is capable of being connected thereto and disconnected therefrom by means of a clutch. When so connected, and the springs of the windlass barrel wound up as already mentioned, and the windlass retained by the pawl, the apparatus is ready for instantaneous action. It is not meant that this apparatus shall be used on ordinary occasions, the breaks being provided with arrangements by which they may be operated in the usual manner for general purposes, the intention being that this apparatus shall only be employed on an emergency arising which renders it necessary that the whole of the brakes of the carriages of a train shall be brought suddenly into action. This is effected by means of lines passing from a barrel on the locomotive to the different carriages, and connected with apparatus by means of which the different pawls on the carriages may be so moved as to set at liberty the barrels containing the springs, which, suddenly unwinding or uncoiling, turn round the barrels, and by means of the chains connected thereto the fusees also, along with the shafts on which they are mounted, thus bringing the brakes into operation. When it is desirable to release the brakes, other lines passing from the locomotive are made to release the clutches by which the fusees are connected with their shafts, and the brakes are then removed from the wheels by springs in the ordinary manner.

The details of the invention are set forth at great length, and are in many respects of so complex a character that they will only be fully understood with the aid of the drawings annexed to the Specification. These include the use of a number of cams, levers, slides, catches, and other mechanism, and also the application of a self-acting brake to each apparatus, in order to prevent the unwinding of the apparatus from being more sudden than might be desirable. Each apparatus is wound up separately by hand after being in use.

[Printed, 1s. Drawings.]

A.D. 1853, September 13.—N<sup>o</sup> 2116. (\* \*)

DUBS, HENRY.—“Improvements in the method of forging or “manufacturing iron and steel.” These apply specially to the forging of crank axles, railway wheels, and larger forgings. Hydraulic pressure is used to forge them by means of gradual compression. An hydraulic press is employed, having an upper

bed or framing to receive a top die, and a lower bed to receive a bottom die. The metal prepared for being forged is placed between the dies, and compressed into the required form.

[Printed, 8d. Drawing.]

A.D. 1853, September 20.—N° 2177.

**WALKER, HENRY.**—"Improvements in the modes or means of stopping or retarding vehicles used on railways."

This invention consists in a mode of causing the buffer rods of railway carriages to apply breaks to the wheels in the event of a collision, or under circumstances which render it desirable to bring a train speedily to a stand. The details of the invention may be greatly varied, but the invention consists essentially in placing collars or shoulders upon the buffer rods, which collars or shoulders, on the buffer rods being forced inwards, act upon certain levers and so cause cams to press break blocks against the wheels, the springs of the buffers, when the latter are set at liberty, forcing the rods outwards as usual and so releasing the breaks. The breaks are thus not only brought into action in case of an unexpected collision happening to the train, but may be purposely caused to operate by the driver of the train slackening the speed of the engine, when the impetus of the rest of the train causing the buffers to act in succession causes the breaks to act also.

The breaks may be variously arranged, and may be made to operate upon the wheels either on those portions of the latter which happen to be nearest to or farthest from the buffer heads. The cams may also be variously shaped, and for guard or tender breaks a modification of the invention may be applied which can be worked by hand, through the medium of a lever or otherwise, while for vehicles having no buffers arrangements may be provided by which rods working after the manner of buffers may apply the breaks.

[Printed, 10d. Drawings.]

A.D. 1853, September 29.—N° 2231.

**RAUX, FRANÇOIS JULIEN.**—"Improvements in railway brakes."

According to this invention each carriage of a train is provided with brake blocks so arranged between the wheels as to be pressed against them when forced in opposite directions, away from each



other, which is effected by having the blocks attached to pistons, through the medium of connecting rods and crossheads, such pistons being mounted in a suitable cylinder attached to the framing of the carriage, and acted upon, when it is desired that the brakes shall operate, either by the pressure of steam, of air, or of water. In order to provide such pressure each carriage is furnished with a metal tube communicating with the cylinder, and the tubes of the various carriages composing a train are connected by short "junction pipes" and certain bell-mouthed nuts or glands, a continuous passage being thus formed along the whole length of the train, and the pipe of each carriage has in it a cock which may be closed when it is desired to prevent access of steam, water, or air to that carriage. When steam is to be employed to actuate the brakes a suitable connection is formed between the line of pipes and the steam chest of the engine, which connection can be opened or closed by a valve. When this valve is closed the pistons are drawn inwards in the cylinder by means of springs connected to the crossheads mentioned above, these retaining the brakes in position and out of contact with the wheels, but on the valve being opened steam passes along the pipes, and entering each cylinder between the pistons forces them outwards and so brings the brakes into action, the springs again taking them out of action when the pressure of the steam is removed. When the pressure of air is to be used each carriage is provided with a small pump which is continuously worked by an eccentric on one of the axles, these pumps continually forcing air into the cylinders, which, however, is allowed to escape therefrom as fast as it enters, through an opening provided for the purpose, when the brakes are not required to act, but these openings being closed when it is desired to bring the brakes into operation by means of valves, and a line of connecting rods which can be moved by hand. When water is used the arrangement is similar, the water being drawn by the pumps from reservoirs with which the carriages are provided.

[Printed, &c. Drawing.]

A.D. 1853, October 4.—N<sup>o</sup> 2261.

**JACKSON, PETER ROTHWELL.**—"Improvements in machinery for manufacturing hoops and wheels."

This invention relates, firstly, to straightening or rendering true the edges of hoops or tyres or runs of wheels, by the employment

of three pairs of rollers, which act simultaneously upon the hoop or tyre while upon a horizontal table. The rollers are so mounted as to be capable of adjustment in various ways, and they may be either cylindrical or conical. If desired, more than three pairs of rollers may be used.

Another part of the invention consists in an improved machine for rolling hoops or tyres, which is so constructed that a hoop or tyre may be acted upon by grooved rollers, the grooves so varying in shape that the hoop or tyre may, by being operated upon by the various grooves in succession, be reduced to any given form or thickness. Different modifications of this part of the invention are described.

Another part of the invention consists in an improvement which is applicable to the machine for making moulds for casting wheels, for which a Patent was granted to the present patentee in the month of February, 1844, such improvement relating to the application of shields to the ends or sides of the segment patterns used in moulding cog wheels, "for the purpose of keeping up the sand" and preventing the moulder from disturbing the pattern or the sand during the formation of the other parts of the mould.

The first and second parts of the invention are applicable to the manufacture of wheels for railway purposes. And the patentee mentions, as of his invention, the constructing of mills for rolling hoops "with the axis of the outside roll stationary, and bringing the inner roll towards the outer one, instead of vice versa, as heretofore," the "gauging apparatus" moving with the inner roll. Also bringing together the rolls of a mill for rolling hoops by means of double screws, one inside the other; and the use of a revolving cutter to remove any objectionable part of the hoop during the process of rolling.

[Printed, &c. Drawing.]

A.D. 1853, October 5.—N<sup>o</sup> 2272.

**TURIFF, ALEXANDER.**—"Improvements in retarding apparatus for the prevention of accidents on railways."

This invention consists "in so combining a wedge action with an effective friction brake, such as an embracing strap on the running wheels, or a modification of the ordinary friction blocks of wood, that when the engine comes up against any body in its path the momentum of the train will drive home the wedge and put the brakes into the most powerful action. The actuating

"wedge may be connected with the buffer movement, and the  
 "brakes may be arranged in any convenient and suitable manner,  
 "the special objects of the improvements being the causing the  
 "momentum of the train to wedge the retarding brakes into  
 "powerful frictional stopping action, so that the whole train will  
 "be almost instantaneously stopped on the occurrence of any  
 "casualty which necessitates the bringing the brakes into play."

The patentee states that the invention may be carried out in a convenient and effective manner "by forming the inner contiguous ends of the buffer rods into inclined planes or wedges, so that each carriage has four such wedges." The inclined surfaces of such wedges are "arranged to be downwards, and their upper plain sides bear against fixed abutment pulleys; on the lower or inclined edges another pulley is arranged to bear in each case, such pulley being set on the upper end of a link passing down to the elbow joint arms of a pair of ordinary friction blocks pressing against the wheels. In this way, whenever the buffers are compressed the two inclines on each side traverse towards each other, and, pressing down the lower pulley they bring the blocks into brake action. When the pressure ceases a light spring relieves the brakes. In case of shunting, or when this brake action is not required to come into force, the upper abutting pulleys are traversed laterally, to clear the incline pieces, so that when the latter are pushed in they cease to affect the brake blocks. To do this a chain or rope is passed along the whole train over guide pulleys, and to allow for the draw spring action angular links are fitted to the draw springs to carry supporting pulleys, round which the chain or rope is passed. As the springs are compressed or recede these links shift their pulley, and regulate the tension of the chain accordingly."

The details of the invention are minutely set forth.

[Printed, 8d. Drawing.]

A.D. 1853, October 6.—N° 2285.

DE CASTRO, MANUEL FERNANDEZ.—"Improved means of preventing accidents on railways."

This invention relates to various means of stopping railway trains when they either get off the line or experience any derangement of the machinery, electricity being the main agent employed. The invention is described at considerable length, a battery of

generator of electricity being carried by the train, and being made to communicate with wires similar to those of the electric telegraph, which are carried alongside the line of railway, "alarm apparatus," consisting of an electric mortar, or a Volta pistol, being employed in some cases. A mode of retarding a train by the use of breaks is also set forth, such breaks acting, not upon the wheels of the carriages, which the patentee considers to be injurious to such wheels, but upon the rails, each carriage being provided at the hinder end with arms projecting downwards towards the rails, and shod with oakum, hemp, or some other substance capable of creating friction without injury to the parts; other arms, projecting downwards below the front part of the carriage, being provided with small wheels, which in case of the front axle breaking will sustain the carriage. The body of the carriage is so connected to the framing as to be capable of being raised or lowered from the wheels, when lowered the break arms pressing upon the rails; a long lever serving to raise and lower the body as required. A "metallic whip" is also described as being provided for the use of the guard of a train, this whip being formed of any suitable fibrous material, combined with wire, so that on its coming into contact with the general conductor these wires shall touch it. "The part which comes in contact with the hand should be covered with varnished leather, or any other bad conductor of electricity, to preserve the instrument and also the guard from the effects of the shock. It will only be necessary, on any danger presenting itself, to twist up one of the ends of his whip, and allow the other to drag upon the ground; he will keep this position until the danger has been passed. This signal would be efficacious even supposing the train to be nearly upon the dangerous spot."

[Printed, &c. Drawing.]

A.D. 1853, October 8.--N<sup>o</sup> 2303. (\* \*)

POOLE, JOHN, and KEMP, JAMES COLQUHOUN.—(*Provisional protection refused.*)—"An improvement in the construction of railway chairs and railway engine carriage and waggon wheels, and the mode of manufacturing railway chairs and fixing the railway bars."

"The removal of the whole or greater part of one cheek or lug of the present chairs now used upon railways or other tram roads; the method of fixing the railway bars or tram plates to the chairs, and an increased diameter or depth of the flange of

“ railway engine, carriage, or waggon wheels, and the mode or process of manufacturing railway chairs.”

[Printed, 4d. No Drawings.]

A.D. 1853, October 8.—N<sup>o</sup> 2306.

DUBS, HENRY.—“ Certain improvements in the manufacture of wheels and tires, and also in the construction of furnaces employed in such or similar manufactures.”

This invention relates in the first place to the manufacture of tires for railway and other wheels, and consists principally in a peculiar method of piling the metal meant to form such tires. The patentee takes a certain number of flat bars, prepared for the purpose, bent into the form of rings, so that the ends just meet, and then piles them one above another, in number and thickness corresponding to the breadth of tire required, taking care that the joints are equally distributed, that is to say, that no two joints are at or near the same situation in the rim, and that whenever there is a joint, at that place there are solid portions of the rings. The tire being thus piled is heated in a furnace, and welded together by means of gradual compression, to be afterwards finished by rolling and turning in the usual manner.

Another part of the invention relates to the construction of the “ smith’s fire ” or furnace employed in such or similar manufactures, and consists principally in the adaptation thereto of a reflector or concave cover formed of fire-clay or other suitable material, which cover may be removed and replaced at pleasure. The boss of a wheel (for example) being placed upon the fire, the cover is placed over the same, and by means of a blast of air the fire is made to ascend through the centre of the boss and between the ends of the arms, and being checked by the cover will be thrown down and spread over the top of the boss. When the fire has imparted its heat it is allowed to escape by the sides of the chimney or flue ; or if desirable the fire may be forced or drawn round the sides of the metal, and allowed to escape by means of a hollow centre in the fire-clay reflector or cover, where there is no central hole in the work under operation.

[Printed, 8d. Drawing.]

A.D. 1853, October 11.—N<sup>o</sup> 2328.

SHARP, JOHN COLIN.—“ Improvements in retarding apparatus for the prevention of accidents on railways.”

This invention relates to "the direct application of steam power to work a series of brakes or retarding apparatus throughout the whole line of carriages in a railway train." To the usual stop valve handle of the engine is connected another valve, in such manner that on the former being closed the latter is opened and allows a quantity of steam to pass down into a range of pipes which constitutes a steam passage from one end of the train to the other below the carriages. Each carriage is provided with "a steam cylinder and piston or other convenient movement," and steam entering such cylinders from the passage already mentioned and acting upon such pistons or other mechanism is made to press the whole of the breaks into operation simultaneously.

The details of the invention may be greatly varied. The steam passage under the train may be composed of metal tubes, one of which is affixed below each carriage, these being connected by short lengths of flexible piping capable of being removed and replaced at pleasure. The breaks may also be variously arranged, but a mode of carrying out the invention is described in which one steam cylinder is fixed below the end of each carriage, and furnished with a piston the rod of which is so connected with an arrangement of levers, links, and connecting rods that on the admission of steam into the cylinder the movement of the piston brings breaks into action simultaneously upon each side [of each wheel of the carriage. The pressure of the breaks may be regulated by means of the valve by which steam is admitted to the passage, and on the pressure of the steam being removed from the pistons the latter are returned into their first position by springs, thus releasing the breaks.

[Printed, 8d. Drawing.]

A.D. 1853, October 12.—N<sup>o</sup> 2338.

GOBLE, GEORGE FREDERIC.—"Improvements in apparatus for signaling and stopping railway trains."

The first part of this invention relates to certain apparatus "for giving an alarm on the road." A steam whistle is placed, by preference, near the funnel of the locomotive, the handle of such whistle being connected to a chain or rod, one end of which is fastened to a crank forming part of a flap or swinging frame, suspended from the front part of the framing of the locomotive, such



flap being meant to strike against a projection or obstacle placed between the rails, and so sound the whistle. Instead of the latter a bell or gong may be used, the flap and its attendant mechanism being modified accordingly.

Another part of the invention relates to a mode of signalizing between the guard and engine driver of a train, and consists in providing each carriage with a chain, which may be conveniently placed under the floor of each carriage, the end of one chain being connected to that of another by means of "split links" or other suitable mechanism.

A chain brake is also described, which may either be applied by hand or be made self-acting. The patentee describes it as being "designed to lock each carriage in a train, in which case  
 " one axle or one wheel at least of each should have a drum  
 " attached thereto in any manner most desirable for affording the  
 " required strength; but the axle of the locomotive, tender, or  
 " other vehicle must be provided with a toothed pinion, working  
 " into a spur wheel connected with a drum," a chain or chains of sufficient length being provided, one end of each being secured to the drum, and one or more turns of the chain being made round the drum of each carriage throughout the train, the chain being made fast to the last drum, so as to "act similarly to a  
 " ship's tiller, chains, and screws. On the axle pinion and the  
 " adjoining spur wheel being thrown into gear, they are made to  
 " operate on a double action screw, so arranged as to grip the  
 " sides of the wheel in a manner effectually to prevent its rota-  
 " tion. It is to be observed, however, that the first and last  
 " carriages, or any number, may be acted on in like manner."

[Printed, *Sd.* Drawing.]

A.D. 1853, October 12.—N<sup>o</sup> 2349.

GIBSON, JOHN. — (*Provisional protection only.*)—"Improvements in fixing tyre on railway wheels."

This invention consists in "making the rings or felloes of railway wheels with angular projections, and also in making the  
 " tyre with like angular hollows, and with a projecting rib or  
 " fillet, in such manner that when the tyre is hot and expanded  
 " it may receive the two angular projections into the hollows,  
 " and by shrinking close upon them, the rib or fillet being then  
 " closed down at intervals, by which means the tyre of a wheel

“ will be very securely fixed on the ring or felloe of the wheel,  
“ and yet in case of its requiring to be removed it may be done  
“ by simply cutting away the parts of the rib or fillet where it  
“ has been closed.”

[Printed, 4d. No Drawings.]

A.D. 1853, October 15.—N<sup>o</sup> 2376.

THOMAS, FREDERICK SAMSON.—“ Improvements in the construction of railway carriages.”

This invention is described at some length, but consists essentially, first, in the use of a compressible and elastic carriage, “ either for railway or other modes of travelling, constructed of sliding tubes, governed by springs, and fitted with elastic materials, or with materials partly elastic and partly otherwise.”

Secondly, in the use of a “suspended buffer” occupying the entire space between the end of one carriage and that of another. such buffers giving to the train “ the character of an articulated vertebræ,” these buffers being so arranged as to be “ completely compressed into their smallest compass prior to any pressure being thrown on the carriages which could derange their forms.”

Thirdly, in the application to railway carriages of axles which are mounted at their centres upon pivots, there being at the centre of each axle springs upon which the body of the carriage rests, other springs sustaining the carriage at the sides, but such springs being so arranged as to admit of the axle turning on its pivot when the carriage is passing round a curve in the rails.

Fourthly, in the employment of “girdles” for preventing the projection of passengers from their seats in case of collision, such girdles passing around the waists and over the shoulders of the passengers, and each passenger being thus retained in his seat “ without the slightest inconvenience or pressure.”

The invention further includes the employment of a “compressible and expansive railway tender;” and also the employment of a travelling buffer, “with compressible and expansive tubes, divided into compartments, and provided with valves or apertures for inflation,” the details of all these particulars being minutely described.

[Printed, 1s. 8d. Drawings.]

A.D. 1853, October 20.—N° 2425.

GOURGAS, GUSTAVE.—(*Provisional protection only.*)—"Improvements in buffer, traction, or suspension springs for railway carriages, trucks, tenders, or locomotives."

According to this invention a spring is composed of "one or more blades or pieces of steel (called spring steel) the length, breadth, or thickness of which vary" according to the purpose for which the spring is intended. One of the ends of the spring is stated to be "fixed, for resistance," the other being "moveable in such manner that diagonal torsion is produced the whole length of the spring," a lever being adapted to this end of the spring "to secure tortuary (torsion) movement." The spring blades are to be straight, and attached together near the fixed end. This lever, it is further stated, being applied "like a key," will keep the spring blades together, one portion of the lever forming a sort of trunnion, and serving as a fulcrum to the spring. The unsatisfactory manner in which the invention is described, however, renders it impossible to understand with certainty what the inventor means.

[Printed, 6d. Drawing.]

A.D. 1853, October 22.—N° 2443. (\* \*)

MERMET, JEAN FRANÇOIS.—(*Provisional protection only.*)—"An elastic spring, contained in a cylinder tube or a tubular case, the lid of which moves up and down according to the pression." If the spring is of metal, "it is disposed in spiral wires." If it is of caoutchouc, gutta percha, or any elastic substance, "it is massive." It can be used "in the inside trimming of common carriages, railway carriages, boats' and ships' cabins;" also in "covered benches, sofas, arm-chairs, mattresses, &c. &c." By means of the "continuous pression of this spring," presses can be made "to dry the skeins," and reels can be settled for winding the skeins of thread.

[Printed, 4d. No Drawings.]

A.D. 1853, October 22.—N° 2445.

WALKER, THOMAS.—(*Provisional protection only.*)—"An improved railway break."

The object of this invention is "to give a train in danger or the persons at a station the power of stopping or retarding a

" coming train so as to prevent a collision or stop the train before arriving at the station." To accomplish this the inventor employs " a break that will skid or lock the front and driving wheels of the engine or leading carriage of the coming train, and bring the same to a stand or retard the progress thereof."

This break consists essentially of two inclined planes, braced together, and having uprights connected to their higher ends, one resting (when placed in position) on each line of rails. According to the description given this apparatus is meant to be placed by persons at a station or elsewhere near a line of railway or on such line when it is desired to stop a coming train, the front wheels of the engine running upon the inclines, against the uprights, and then forcing the apparatus along the rails until the momentum of the train is overcome. The apparatus may be furnished with wheels, if desirable, but no method of enabling persons in a train to apply such an apparatus is set forth.

[Printed, &c. Drawing.]

A.D. 1853, October 25.—N<sup>o</sup> 2456.

PALMER, CHRISTOPHER RICHARD NORRIS.—(*Provisional protection only.*)—" An improved mode and apparatus for preventing accidents on railways, including improvements in signaling apparatus."

The apparatus for signaling between the guards and drivers of railway trains consists in the employment of " liquids or atmospheric air, or gasses or elastic fluids, condensed or non-condensed " according to circumstances. Various arrangements suitable for the purpose of this part of the invention are described, cylinders containing pistons being arranged so as in some cases to sound a bell or alarm, in others to discharge detonators, and in others to move coloured signals, but these arrangements will only be clearly understood by an examination of the Specification, which is of considerable length, reference being also made therein to a patent granted to the present inventor previous to the date of the present application. The cylinder of one carriage may be connected to that of another by means of tubes, the joints between the carriages being made " on the fishing rod joint principle," forming a " joint and cup," there being outside this a bayonet catch or spring fastening.

The invention is also applicable to the working of the breaks of a railway train, cylinders containing pistons being so arranged

as to apply the breaks when requisite by the admission of condensed air to such cylinders, the breaks being released instantaneously by the opening of small valves which permit the condensed air to escape. Buffers are also formed on the same principle, and the inventor states that where "enormous buffer or elastic power is required" he obtains it to an unlimited extent by using "an elastic or air-tight bag with air, gas, or other elastic fluids, of any required density," this being "inserted into the cylinder behind the piston. When collision occurs the piston is forced against bag, but the latter being elastic, and its contents also," the buffer power obtained "is almost unlimited." If highly condensed air be used the bags are fitted through a valve after they are placed in the cylinders, this arrangement affording at any time the means of refilling them.

[Printed, 4d. No Drawings.]

A.D. 1853, October 25.—No 2462.

NEWTON, ALFRED VINCENT.—(*A communication.*)—"An improved construction of railroad carriage axle."

This invention relates to "a mode of constructing compound axles, one part or section of which is hollow and the other solid. The solid section is inserted in the chamber of the hollow section, and is secured in place by a key which passes through the outside or hollow section into an annular groove in the inside or solid section, the whole being retained in place by a band and set screw. When thus combined the wheels move together or independently of each other, as may be required."

The result of this arrangement is that carriages to which these axles are applied will "run upon a curve with great ease and facility," torsion of the axles being also avoided.

[Printed, 8d. Drawings.]

A.D. 1853, October 27.—No 2483.

BLACKWELL, THOMAS SEAL.—(*Letters Patent void for want of Final Specification.*)—"Improvements in apparatus for signaling and stopping railway trains."

According to one part of this invention a brake on the "principle of the shoe brake" is placed either before or behind the locomotive of a train, this shoe, when let down upon the rails of the line, being pressed forcibly thereon by means of a piston

“ working free through a cylinder until pressed upon by the  
 “ buffers,” such piston being acted upon by “ a novel arrange-  
 “ ment of rails having slots and sliding pieces therein, the slide  
 “ pieces being properly grooved and furnished with curved  
 “ jointed arm pieces and support wheels, also balancing pulleys,  
 “ which rise and fall when pulled by the draw rod.”

“ The brake or brakes for preventing collision of trains, if  
 “ united into one, become a kind of travelling flooring, having  
 “ grooves underneath and portions of railway upon it, inclining,  
 “ when not in use, downwards from the back or front of the train  
 “ to the level of the common rail. At one end it has powerful  
 “ buffers to prevent injury whenever an engine or carriage runs  
 “ upon it; also buffer springs to receive the wheels of the advanc-  
 “ ing locomotive. The back train, which would otherwise run into  
 “ the fore train, is thus prevented from doing any serious damage  
 “ to the forward train.” Another form of brake “ is constructed on  
 “ the principle of pincers or nippers, and is intended for gripping,  
 “ holding, or locking the train on the line;” no particular  
 description of this brake, however, being given.

[Printed, 4d. No Drawings.]

A.D. 1853, October 29.—No 2501.

SMITH, EDWIN DALTON.—(*Provisional protection only.*)—“ An  
 “ improvement in the construction of railway carriages, whereby  
 “ in the event of collision the crushing of the carriages will be  
 “ prevented.”

According to this invention the ends of the framing of the car-  
 riage are each provided with a “ shoe ” or projection of somewhat  
 wedge-shaped form, but having the highest point nearer to one  
 side of the framework than the other, and extending between the  
 buffers, but not so far outwards as the latter. “ A collision taking  
 “ place sufficiently powerful to destroy the buffer the points of  
 “ contact will then be upon the projecting shoe form of the end  
 “ of the carriage. The point of this shoe being placed out of the  
 “ centre, coming in contact with the shoe of the next carriage, will  
 “ have the effect of throwing the carriage off the line. The other  
 “ carriages will alternately be thrown off on opposite sides of the  
 “ line, so that there will be the distance of a carriage between  
 “ each, and thus the crushing of the carriages will be pre-  
 “ vented.”

[Printed, 6d. Drawing.]



A.D. 1853, October 31.—N° 2516.

**BROWN, JOHN.** — "Improvements in the construction of  
" wagons."

This invention relates principally to such wagons as are intended  
" for coal or mineral traffic," and consists " in making the bodies  
" or freight spaces in such a manner that they shall be suspended  
" from their framework in place of resting thereon, the lower por-  
" tion of the body descending below the axles to within a very  
" short distance from the surface of the ground." The bodies of  
the wagons are by preference " of a circular conical shape, the  
" narrow portion being below, so as to permit the contents the  
" better to slide through the bottom, which is so constructed as  
" to slide when acted upon by a lever handle, and thus allow the  
" contents to drop into any receptacle below. The slide door in  
" the bottom may move on friction rollers in the guides, at each  
" side, to lessen the friction in opening and shutting, and may  
" also have a rack and pinion to open it, or a screw, if thought  
" preferable, or the door may be made to open on a centre, or in  
" any other convenient mode."

Different modifications of the invention are described, the bodies  
of the carriages being in all cases, however, of wrought iron, and  
suspended from the framework by straps or brackets. In one case  
the body is of " conical rectangular shape, with rounded corners,"  
the bottom being provided with hinges and fastenings, and a cover  
being likewise hinged to the upper part. In another case the body  
is of " circular conical form," with a sliding bottom, and in another  
case a rectangular body has the discharging door fitted to the side  
or end thereof.

Although the patentee does not mention in the Specification  
that these wagons are meant for use on railways they are shown  
in the drawing annexed to the Specification as applied to that  
purpose only.

[Printed, 10d. Drawings.]

A.D. 1853, November 2.—N° 2536.

**SMITH, EDWIN DALTON.** — "A new buffer break for railway  
" carriages."

According to this invention the breaks of a railway vehicle are  
so arranged as to be brought into action by the ends of the buffer  
rods when the latter are forced inwards. Each wheel is provided

with a separate break, which is connected to a piece of mechanism forming a kind of elbow lever, one part of which projects upwards and is provided with a strong compound spring, this being opposite one end of one of the buffer springs, which are flat springs passing across the carriage framing, and the result being that on the buffer rod which is opposite that end of that buffer spring being forced inwards, the buffer spring acts against the break spring and the break is pressed against the wheel, the spring of the break, however, causing that pressure to act gradually. In the arrangement described, the buffers of one end of a carriage will thus act upon the breaks of the wheels nearest to that end, and the other buffers upon the breaks of the other wheels. By checking the speed of the engine, all the breaks of a train may thus be brought into action by the impetus of the carriages, with the exception of those of the hinder wheels of the last carriage, but the whole of the breaks may likewise be brought into action by means of a chain, which is so arranged as to act upon certain sliding framework, by which the buffers may be brought into operation by the guard of the train, or by mechanism connected with the engine. In order to provide for backing a train certain rods are employed, which, on being placed in a horizontal position, serve as abutments between one carriage and another, and so prevent the buffers and breaks from acting.

[Printed, *Is.* Drawings.]

A.D. 1853, November 4.—N<sup>o</sup> 2563.

RACSTER, WILLIAM.—“Improvements in the construction and  
“ arrangement of the buffing apparatus of railway carriages, and  
“ the mode of applying the buffer and draw springs to such  
“ carriages.”

According to this invention the buffer rods, which are arranged in pairs, as usual, “extend back considerably beyond the centre  
“ of the carriage. The ends of one pair of rods are made to slide  
“ in slots or sockets made in or attached to the pair at the other  
“ end of the carriage, and vulcanized india-rubber or coiled  
“ metallic springs are adapted to the ends of one of the pair in  
“ order to neutralize the effects of sudden concussion. The rods  
“ of each pair of buffers are connected together at their inner  
“ ends by cross rods, so that they are made to act simultaneously.  
“ These cross rods are jointed to the parallel buffer rods in a  
“ peculiar manner, so to allow a certain amount of play to the

" pins at the joints in order to allow the cross rods to assume a  
" diagonal position according to the working of the parallel rods.  
" By this means, in going round curves, and under other circum-  
" stances that may arise, one rod may be forced in a little more  
" than the other rod, but in so doing it must inevitably push out  
" its fellow rod, so that when the carriages are coupled up pro-  
" perly any tendency to a jolting or lateral oscillating motion  
" would be to a great extent obviated, and when a carriage has  
" its two pairs of buffers pressed upon at both ends by other car-  
" riages, this pressure at both ends will act on the draw rod and  
" produce the effect of two pulls on the carriage instead of simply  
" two pushes, and these pulls will act at points beyond the centre  
" of the carriage."

Besides the coiled metallic or the vulcanized india-rubber springs at the ends of the buffer rods, there are other flat metal springs of the ordinary construction placed at or near the centre of the buffer frame of the carriage, these being intended to act both as buffer and draw springs, and being operated upon by the buffer rods at or near their ends by means of levers or arms, connected by links to the cross arms at the ends of the buffer rods. These flat springs are attached by their centres to blocks, capable of sliding in grooves or sockets fixed to the carriage framing. The hinder buffer rods cause a pressure against the ends of the forward springs, and the forward buffer rods against the hinder springs, while the forward draw rods are secured to and made to act upon the centre of the forward spring, so that when the carriages are pulled forward by the forward draw rods the hinder buffer rods, which are connected with this draw spring, will, if properly screwed up, be forced back against the buffers of the succeeding carriage.

Different modifications of the invention are described, the main object of the invention being "that the buffing apparatus may, when submitted to a given amount of pressure, form one continuous frame throughout the whole train," this resulting in a shock given to the buffers being more equally distributed than by the usual arrangements of buffers.

[Printed, 10d. Drawings.]

A.D. 1853, November 7.—N<sup>o</sup> 2584.

WIGLESWORTH, HENRY. — "Improvements in connecting together or coupling railway carriages."

These improvements "relate to the application of cross connections between the adjoining ends of the carriages of a train of carriages in order to diminish oscillation or undue sideway motion, such connections between the carriages being in pairs, each of a pair passing from the side of one carriage to its attachment at the opposite side of the adjoining and connected carriage, and each crossing the other in passing to such attachment; and each pair of connections is so connected to a central draught rod that the pull upon such draught rod will at all times tend to tighten the cross connections, whereby the amount of oscillation will be lessened by one carriage being prevented moving sideways without its adjoining carriage."

An arrangement is described in which the draught hooks, which are of the ordinary character, are each connected to a rod which, instead of being directly connected to a spring, as usual, is connected to one end of a chain which passes round a pulley carried by a second rod, the latter being attached to the spring, and the chain proceeding onwards to a third rod which is secured to a frame capable of sliding to and fro in guides, and the sliding frame of one carriage being united with that of the next by chains and links, which form the "cross connections" mentioned above.

[Printed, &c. Drawing.]

A.D. 1853, November 9.—N° 2600.

DICKS, WILLIAM.—(*Provisional protection only.*)—"Improvements in wheels for carriages."

According to this invention the spokes of carriage wheels are composed of metal, "being made hollow and elliptic, the spokes being set so as to present their narrow or cutting edges and thus offer less resistance to the atmosphere than when placed as at present. The tires may also be formed of iron, and made double, so that when the outer tire is worn it may be easily replaced. The spokes may be cast into the nave."

The inventor mentions these improvements as being "principally intended for carriages for common roads," but the arrangement set forth being obviously applicable to wheels for railway purposes also it was thought desirable to notice the invention here.

[Printed, &c. No Drawings.]

A.D. 1853, November 15.—N° 2642.

CATTERSON, JOHN JOSIAS. — "Improvements in carriage  
" springs."

'This invention consists in a mode of combining "two long  
" single springs with one double spring, or four long single  
" springs with two double springs," the patentee meaning by  
" double spring " a spring "fixed at or near its centre," and by  
" long single spring " a spring fixed at one end, having only  
one elastic arm, and being of a length "exceeding one half of  
" that of the double spring which is applied in combination with  
" it."

Various modifications of the invention are described. Thus in  
one case a double spring, which may be of any convenient con-  
struction, is mounted upon the axle of a carriage, and is at each  
end connected by links to one end of a long single spring, these  
springs crossing each other above the double spring, and having  
their other ends connected to the framing of the carriage. In  
another case one long single spring is attached or linked to each  
end of a double spring, one of the former being above and  
another below the latter. In another case two double springs,  
placed parallel with each other and at some distance apart upon  
an axle, have connected to them at each end single springs, which  
cross each other transversely above them and are connected to the  
body of the carriage.

These arrangements are applicable both to ordinary and to  
railway carriages, the double springs in the former case resting  
upon the axles, as mentioned above, while in the latter case they  
rest upon the axle boxes.

[Printed, 1s. Drawings.]

A.D. 1853, November 16.—N° 2650.

ELLERTHORPE, JOHN.—(*Provisional protection only.*)—"Re-  
" tarding and stopping railway trains and railway carriages."

In this invention one of the axles of a railway carriage has  
upon it two friction cones, which are placed loosely upon the  
axle, a short distance apart, and with the smaller ends towards  
each other. Between these is a double hollow or female cone  
capable of sliding upon a key on the axle, with which it is con-

stantly rotating when the carriage is in motion, the arrangement being such that on sliding the hollow cone in one direction it comes into contact with one of the cones mentioned above, and so causes that cone to rotate also, and with it a bevil wheel attached thereto, the latter then acting upon other gearing through the medium of which it puts in motion a long shaft mounted in suitable bearings. This shaft is provided with right and left hand screw threads, and upon these are mounted bosses having internal threads, arms projecting from these bosses and carrying break blocks, which by the rotation of the shaft are thrust against the wheels of the carriage. When it is desired to withdraw them therefrom the sliding hollow cone is withdrawn from the cone on which it has been operating, and placed in contact with the other cone, which, by means of a bevil wheel connected thereto, then reverses the action of the apparatus. The sliding hollow cone is moved to and fro by a lever, and if desirable each carriage of a train may be furnished with a screwed shaft, and bosses with arms carrying breaks, the shaft of one carriage being connected with that of another by suitable means, and provision being thus made for bringing into action the whole of the breaks of the train simultaneously.

[Printed, &c. Drawing.]

A.D. 1853, November 18.—N° 2673.

PARSONS, PERCEVAL MOSES.—(*Provisional protection only.*)  
—“Improvements in railway and other carriages and vehicles.”

The inventor of these improvements constructs “such carriages  
“and vehicles with certain mechanical arrangements and contri-  
“vances, which when thrown into gear by hand or otherwise,  
“will cause the rotatory motion of the wheels or axles to force  
“the breaks of the same carriage or vehicle into action; or will  
“cause the rotatory motion derived from a periphery of a certain  
“wheel or ring, turning at one rate of speed, to be transformed  
“and applied against that of another wheel turning at a different  
“rate of speed or in a different direction. The first may be  
“accomplished by placing on the axle a friction clutch and clutch  
“box, one of them fixed to and revolving with the axle, the other  
“loose, and allowing the axle to revolve freely within it, the  
“latter having attached to it cranks, levers, eccentrics, or other  
“similar contrivances, by which, together with a suitable mechani-  
“cal arrangement of shafts, levers, cranks, pins, rods, pulleys,



" weights, or springs and brake blocks, when thrown into gear  
 " by hand or otherwise, the motion caused by its tendency to  
 " revolve with the axle will be imparted to the brake blocks, and  
 " cause them to be forced against the wheels or rails, or else-  
 " where, for the purpose of retarding or stopping the train.  
 " Instead of a clutch and box an endless screw or worm, or a  
 " friction clutch and box in connection therewith, or any other  
 " suitable contrivance may be employed, for the purpose of  
 " rendering the rotatory motion of the wheels or axles available.  
 " The second may be accomplished by constructing the wheels  
 " with or attaching to them rings of different diameters, slightly  
 " conical, concentric with the wheel and axle, with a pulley, also  
 " slightly conical, and of the same diameter as the space between  
 " the rings, turning freely on a shaft carried by the framing of  
 " the carriage, and placed in such a position that it can be made  
 " to slide forward, so that when thrown into gear by hand or  
 " otherwise, it will force the pulley in between the two rings, one  
 " of which turning with it the pulley will cause its opposite side  
 " to rub against the other ring, and thus retard or stop the  
 " circular motion of the wheels."

In order to prevent the "play of the carriage on the springs"  
 from interfering with the action of the brakes, the springs are  
 constructed in such manner that certain of the plates of which  
 they are composed are "made to strain or brace or reduce the  
 " compass of the spring to any required degree by their tensile  
 " action on one or more of the others, or on each other, in such  
 " a manner as to allow it free action to yield or bend to any  
 " weight or strain it may be subjected to greater than that to  
 " which it is thus braced or strained." The details of this part  
 of the invention are minutely set forth, and the inventor states  
 that such springs are applicable not only as bearing springs, but  
 also as buffer and draw springs.

[Printed, 4d. No Drawings.]

A.D. 1853, November 19.—N<sup>o</sup> 2695.

WHARTON, EMANUEL.—"Improvements in the manufacture  
 " of railway wheels."

The object of this invention is so to construct railway wheels as  
 to prevent accidents from "the breaking and flying off of por-  
 " tions of the tyres."

According to one modification of the invention the wheel is "made in halves for the purpose of securing the tyre firmly "between them," each half in fact resembling a wheel without a tyre, and those portions of the rims of these halves which are to be inside the complete wheel being suitably bevilled for the reception of a dovetailed rib which is formed inside the tyre. The latter is "turned with a slight taper on either side of the rib," and being slightly heated (if desirable), the halves of the wheel are then drawn tightly into it by means of bolts and nuts. "Distance pieces" are then placed between the two halves, the bolts being afterwards removed and rivets inserted in their places, by which the parts are firmly united. When it is necessary to replace the tyre the rivets may be removed, and the operation described above be repeated with a fresh tyre. Steel or steeled iron tyres may be applied without being heated.

Various other modifications of the invention are described, including the application of the invention to a "single spoke "wheel" instead of a double wheel such as mentioned above, as also to disc wheels, and "back to back spoke" wheels, in one case the arms and felloe of such a wheel being of **L** iron, while in another case they are of **T** iron. In all these modifications, however, the main feature of the invention is the same, the tyre being in each case secured to the other parts of the wheel by being dovetailed therewith, the arrangement of the dovetail parts being varied to suit particular circumstances.

[Printed, 1s. Drawings.]

A.D. 1853, November 24.—N<sup>o</sup> 2732.

CHALMERS, DAVID. — (*Provisional protection only.*) — "Improvements in railway breaks and signals."

According to this invention the break blocks of a railway carriage are applied through the medium of weighted levers, the weights being allowed to act when desirable, and being raised by means of chains passing over pulleys, and actuated by means of longitudinal shafts, one of which is placed underneath each carriage, the shaft of one carriage being connected to that of another by means of "socket joints" which allow for the action of the buffer springs, rotation being given to these shafts by means of a vertical shaft mounted upon one or other of the carriages, and

turned through the medium of bevil or other gearing and a hand wheel.

In order to communicate signals from one part of the train to another the inventor places on the top of each carriage of a train a tube of some flexible material, the tubes of the several carriages being connected to each other by means of sliding socket joints, "a continuous and perfect speaking tube" being thus formed, by which the guard can communicate with the engine driver, and vice versa, "in oral language, which must be the most perfect and safest of all signals."

[Printed, 6d. Drawing.]

A.D. 1853, November 25.—N<sup>o</sup> 2741. (\* \*)

DE MONTFERRIER, ALEXANDRE ANDRÉ VICTOR SARRAZIN.—"An improved mode of constructing the wheels of land carriages for common roads and railroads, so as to facilitate their progress, and reduce the wear and tear." The wheel is composed of two separate parts; "one part is fixed to the vehicle in the ordinary manner, and moves within the second part, which consists of a circular plate, put in contact with the common road or railroad." The first part consists of a nave with four radial spokes. The spokes are double, each pair being connected at the outer ends by a pin, which carries a small grooved roller. The circular plate is fitted into the space between the double spokes, so that the rollers may bear upon the edges of four equidistant circular openings in the circular plate, and the nave may play freely in a central circular opening in the plate. "By this means the vehicle is supported and made to move on the inner edges of the circular openings."

[Printed, 8d. Drawings.]

A.D. 1853, November 26.—N<sup>o</sup> 2764.

ROUSSELOT, JOSEPH SCIPION.—"An improved application of magneto-electricity for driving machinery and for neutralizing the impulsive force of machinery in motion."

One part of this invention consists in employing (by preference) atmospheric air as a medium for giving motion to the working parts of any suitable arrangement of engine, such air being heated "by the combustion of gas obtained by passing a current of electricity through water, and thereby resolving it into its

"elements." The apparatus employed consists of a series of permanent horse-shoe magnets "which are fixed to the framing of the engine in such a position that they will severally act in connection with an armature of soft iron mounted on the axles of the running wheels of the engine, and rotating therewith in close proximity to the poles of their respective magnets. These armatures are severally covered by a coil of copper wire, which transmits through its extremities the current of electricity generated by the rotation of its armature in pulsations to a conductor affixed to the framing; from this conductor wires lead to the water to be decomposed, and as often therefore as the circuit is completed a current of electricity is passed through the water."

Another part of the invention relates to neutralizing the impulsive force of machinery in motion, staying, for example, "the progress of a locomotive engine and train;" the patentee here availing himself "of the electric current generated as above described," but diverting it from the course indicated into the coils of an electro-magnet attached to and revolving with the adjacent running wheel, the wheel being by this means converted into a running magnet, its tendency to adhere to the rail being increased. He also proposes to provide any number of the wheels of an engine or carriage with electro-magnets for the purpose of converting the wheels into temporary magnets, and through the attraction set up between the wheels and the rail to effect the stoppage of the train.

[Printed, 8d. Drawing.]

A.D. 1853, November 28.—No 2766.

PRITCHARD, WILLIAM.—(*Provisional protection only.*)—"Improvements in buffers for diminishing the shock in the collision of railway trains."

This invention relates to an arrangement of spring buffers, which are meant to be connected to the framework of the locomotive at one end of a railway train, and also to the framework of the last carriage or other vehicle. The buffer apparatus itself consists of a box of any convenient size and shape, within which a square bar is arranged to move to and fro, this bar protruding from the front of the box, and having at the front end a circular face plate, which may be covered with india-rubber or other

suitable material. On two opposite sides of the square bar are strong ratchet teeth, pointing towards the front of the box, and on each side of the box are mounted three strong springs, each terminating in a "thick notched end of steel," these springs pressing against the teeth of the bar, and the arrangement being such that the bar may be forced inwards into the box, the springs affording, however, a certain amount of resistance to such inward motion, and their ends passing over the teeth in succession, and so locking the bar and preventing its return until they are released from the teeth, which is effected by an arrangement of screws provided for that purpose.

[Printed, 4d. No Drawings.]

A.D. 1853, December 8.—N<sup>o</sup> 2845.

ADAMS, WILLIAM BRIDGES. — "Improvements in railway wheels, their axles and boxes."

The patentee mentions in the first place the advantages of disc wheels as compared with those having spokes, and then proceeds to state that one part of this invention consists, "in the construction of a wheel with a disc body of timber." A number of wedge-shaped pieces of timber are first placed together, and united by dowels or tongues of thin iron, a rough disc being thus formed which is then placed upon a circular table revolving on a vertical axis, the table "being adjustable slightly out of the horizontal level," there being at a convenient distance from this a narrow vertical saw, and the result of the arrangement being that the disc is "cut to a true circle, conical on the edge." It is then forced into a peculiarly formed tyre, furnished with an internal rib, a flat ring of iron being afterwards bolted to the whole, the tyre itself being, however, without holes, and being thus rendered more durable than the tyres ordinarily used. Instead of a disc of wood, a metallic disc may be used, this being either of wrought or cast iron, as may be preferred. A disc of boiler plate may be used (for example), and a tyre cast thereon, holes being made near the outer edge of the disc, through which portions of the cast metal will pass and so secure the tyre to the disc, the tyre being hardened on the outer portion by the use of a chill mould or instead of holes in the disc "projections or hollows or fangs" may be arranged to secure the tyre thereto. A nave or boss may also be secured to such a disc by similar means, the invention including a variety of particulars, and the patentee claiming,



among other matters, wheels such as described above "with elongated centres, arranged for the wheels to revolve on axles independently of each other, such axles also revolving either in bearings of the common kind," or of the kind described by the patentee as forming another part of the invention, one arrangement of which consists in causing the axle box "to clip the axle with bearings above and below," the box being thus prevented from tilting, there being "a packed groove between the joint of the box," and a "front feed hole, and sliding metal wearing plates in front or in contact with the central collar to prevent end play;" these being "removable when worn." Wheels such as described may be either fast upon the axles or be placed loosely thereon, and may have the rib tyres fixed thereto by means of an expanding hoop, or expanding hoops. Axle bearings are also described as being in some cases furnished with a collar "at or about the centre of the bearings, such bearings being either cylindrical or conical," and hollow axles are also mentioned as being composed of "segmental bars in two or more circles, breaking joint with each other, the collars of such axles being either welded on in the solid, or shrunk on hot when required for loose wheels;" these axles being hollow.

[Printed, 8d. Drawing.]

A.D. 1853, December 8.—No 2847.

MORAU, THOMAS.—(*Provisional protection only.*)—"An improved means or apparatus for the prevention of accidents on railways in certain cases, which is also applicable to other purposes."

This invention consists in applying to the last carriage or van in a train an apparatus which may at any time be lowered down upon the rails so as to receive the blow of the engine of a second train which may happen to overtake the first, or so as to operate as a break for the first train when requisite. The apparatus consists of a strong frame, from which extends behind the back of the carriage a pair of false or moveable rails, so formed as to present when in use upon the permanent rails an inclined plane for the wheels of an overtaking engine to run upon, the back of the said frame being also formed to receive the fore wheels of such an engine, and present an obstacle to their progress. These false or moveable rails are formed also with a flange on



" their outer or inner side, for the purpose of keeping them with  
 " the whole apparatus in their place on the permanent rails when  
 " struck by the wheels of an overtaking engine," and they are  
 provided with cavities for the reception of such wheels, so as to  
 admit of the latter turning without biting the rails.

The carriage or van provided with this apparatus may in case  
 of an expected collision be detached from the rest of the train,  
 and left to receive the shock of the overtaking train. When  
 used as a break the apparatus is merely lowered or forced down  
 upon the rails by any suitable means.

[Printed, *4d.* No Drawings.]

A.D. 1853, December 9.—N<sup>o</sup> 2875.

**BESSEMER, HENRY.** — "Improvements in the construction of  
 " railway axles and breaks."

One part of this invention relates to the composition of railway  
 axles, the object being to render such axles more durable than  
 those ordinarily used, and it consists in combining two or more  
 metals together in the construction of such axles, the vibrating  
 properties of such metals being different, " so that all tendency  
 " to vibrate in the combined mass is nearly or quite destroyed by  
 " their mutual counteraction." An axle may be formed (for  
 example) of wrought iron, and galvanized or tinned from end to  
 end, with the exception of the parts forming the bearings or  
 journals, the different metals being then united by heat; or a  
 hollow iron axle may be lined or filled with a different metal; or  
 an iron axle may be made hollow and then both filled and coated  
 with metal of a different quality. And in placing wheels upon  
 such axles the opening of the nave is made of such size as to leave  
 a small space around the axle, which space is then filled with some  
 metal differing in its vibratory properties from iron, which is run  
 into the space in a fluid state, the wheel having been previously  
 heated, and consequently gripping the metal firmly when it  
 cools.

Another part of the invention consists in "causing the whole of  
 " the lateral strain produced by the oscillation of the carriage to  
 " be borne by the end of the axle and not by the sides of the  
 " journals, as heretofore practised," the end of the axle being  
 made of steel or being fitted with a plug of that metal, and the  
 brasses being arranged in conjunction with certain girders and  
 tension rods, one effect of the arrangement being that "any

"bending outward of the axle guards" is prevented, the brasses, moreover, being adjustable by means of screws.

Another part of the invention relates to a mode of applying breaks to railway carriages, and one modification of this part of the invention consists in fixing upon the axles of a carriage drums which are of smaller diameter than the wheels, and upon which breaks are made to act when necessary by means of pistons working in cylinders in which hydrostatic pressure is exerted through the medium of pipes connected with the boiler of the locomotive engine of the train, or with a suitable force pump, the breaks, according to another modification of the invention, being actuated by means of "hollow india-rubber pieces," filled with water, upon which pressure is exerted, when requisite, by means of a force pump, or by bringing to bear thereon the pressure of the steam in the boiler, as in the first arrangement, springs or some equivalent contrivance being used to remove the breaks from the drums when they are no longer required to act.

[Printed, 1s. Drawings.]

A.D. 1853, December 12.—No 2886.

HOLLINSWORTH, THOMAS.—"Certain improvements in the method of applying 'breaks' to carriages employed upon railways, and in the machinery or apparatus connected therewith."

This invention relates to the employment of compressed air in actuating railway breaks. The apparatus to be used "consists of an air pump or pumps of any ordinary or other construction, to which is attached a receiver or reservoir into which the air is forced by means of the said pump or pumps, and which may be worked either by an excentric or any other suitable motion from the axle of the guard's break van or any of the carriages, or by any mechanical arrangement independent of any motion obtained from the said break van or any of the carriages. Connected with the receiver is a safety or discharge valve, by which the superfluous air is emitted after the necessary or required pressure has been obtained. The communication between the air receiver and the break or breaks may be made by means of a small cylinder and piston acting upon levers, or by any more suitable arrangement, and the 'break' or 'breaks' may thus be instantaneously put upon the wheels simply by opening

"flooring thereof, and is fitted with screw threads or worms, which (when an axial motion is imparted thereto by the ordinary hand wheel and gearing used by the guard for setting the brakes in action) will force the brakes against the periphery of the wheels of the carriage."

This motion is communicated from the guard's to the other carriages in the train by connecting the rods of the several carriages together "by a kind of telescope joint," which allows of "longitudinal play" without affecting the axial motion imparted thereto, universal joints being also provided for the purpose of admitting the "lateral play" of the carriages.

[Printed, 4d. No Drawings.]

A.D. 1853, December 16.—N<sup>o</sup> 2925.

TRUSS, THOMAS SEAVILLE.—(*Provisional protection only.*)—"Improvements in brakes for railway carriages and other vehicles."

According to this invention each axle of the carriage has fixed upon it a flanged drum, a connecting rod passing from axle to axle, and this connecting rod being combined with certain weighted levers, which by moving a bar having in it inclined slots in which rollers connected with the weighted levers work, are made to act upon a strap brake which passes round the drums, and so either tightens or slackens the strap at pleasure; those parts of the strap which are next the drums being lined with wood, which upon the tightening of the strap is pressed upon them. The inventor mentions that racks and pinions, and other mechanism, may be used in working this brake, but the invention is in no respect clearly described.

[Printed, 4d. No Drawings.]

A.D. 1853, December 24.—N<sup>o</sup> 2990.

MARGERISON, JOSHUA.—(*Provisional protection only.*)—"Improvements in railway breaks."

This invention consists "in furnishing the carriages and tender of a railway train with a longitudinal sliding bar, to which is attached a chain acting upon knee-joint levers which bring into action a pair of clamp breaks, such breaks being made each to act upon a drum fixed on the axles of each carriage."

"A slight play is allowed between the ends of the several bars to admit of the screwing hard up in coupling. A rack and

“ pinion or other suitable mechanical arrangement in the break  
“ van or tender serves to bring the break of that particular van  
“ into action, and by the contact of the end of this rack with the  
“ end of the sliding bar of the next carriage,” which is again  
connected with the sliding bars of the other carriages “the whole  
“ of the friction drums of the train may be acted upon simul-  
“ taneously. Springs are employed to return the levers to their  
“ original position when the pinion is reversed.” “Should the  
“ clamp break be found too powerful, a short lever, with clogs,  
“ and spring behind, may be suspended on each side of the  
“ drum, and be acted upon by the sliding rod.”

“ By another arrangement the clamp levers are worked by a  
“ third lever, the shorter end of which is connected by a chain to  
“ the knee-joint of the clamp levers, while the other end is con-  
“ nected by a crank to a cross bar which unites the two buffer  
“ heads. The sliding bars above described may be obviously  
“ applied to the working of the ordinary breaks on the wheels  
“ themselves, and in some cases the knee-joint levers may be  
“ replaced by other mechanical arrangements.”

“ Another form of break applicable to engines consists of a  
“ stand upon the side or framework of the engine near to the  
“ centre of the driving wheel. On this stand is fixed the ful-  
“ crum of a lever, the short end of which would be immediately  
“ over the crown of the driving wheel, and the long arm extending  
“ to the furthest end of the engine from the situation of the  
“ driver. To the fulcrum end is attached a shaft, bearing down  
“ upon the centre of the driving wheel, and fixed there to a clip  
“ break over the crown of that wheel. From the points of this  
“ break is attached a connection to work a small lever break on  
“ the face of each running wheel. This machinery must be  
“ attached to each side of the engine, and so balanced as to be  
“ out of action when at rest. From one extreme point of the  
“ levers to the other, across the head of the engine, is passed a  
“ bar that unites those points, and upon that bar must be fixed  
“ another lever, the long arm of which stretches back to the hand  
“ of the engineer or stoker; to be acted upon either by hand  
“ pressure, a weight screw, or spring, but perhaps the pressure  
“ from the hand would be sufficient with a compound lever of  
“ such length as might be used.”

“ Certain portions of the arrangements herein-before described  
“ are obviously applicable to common road carriages.”

[Printed, 4d. No Drawings.]

A.D. 1853, December 28.—N° 3006.

ALEXIS, JOSEPH.—(*Provisional protection only.*)—"An improved railway brake."

To the axle guards of each carriage of a railway train pieces of metal are fixed, which are provided with anti-friction rollers supporting longitudinal bars of metal, these being outside the wheels, the ends of the bars passing through plates attached to the framing and having thereon buffer heads, the buffer heads of one carriage being in contact with those of the carriages before and behind it, and the whole of the bars being operated upon, when requisite, by the buffer heads of two other short sliding bars which are attached to the luggage van, which in carrying out this invention must be placed next the tender and in front of the carriages. The brake blocks are connected to the longitudinal bars by means of springs. "One side of each of these blocks is " of the same curvature as the tires of the wheels, and the other " sides thereof slide upon inclined surfaces fixed to or formed on " the longitudinal bars," other inclined surfaces being fixed to the framework of the carriages, the object of these parts of the arrangement being to impart both horizontal and vertical movement to the brakes simultaneously, and this result being produced through the agency of the short sliding bars carried by the luggage van, which are held back when the brakes are not required to act by a catch, but thrust forward by a spring on such catch being released, the effect being that the longitudinal bars are moved in their bearings and the brake blocks forced between the tires of the wheels and the rails, thus "scotching" the train. Springs are provided for returning the brakes to their first positions when released.

[Printed, 4d. No Drawings.]

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1854.

A.D. 1854, January 2.—N° 5.

MONTEL, PIERRE AMBROISE.—(*Provisional protection only.*)—"Certain improvements in stopping the trains on railways."

In lieu of applying brakes to the wheels of carriages in the ordinary manner the inventor raises the carriage and causes it "to

" be borne by supports resting upon the rails, so that the carriage  
" is caused to slide upon the rails, and is thus soon stopped.  
" The carriage is raised by its own momentum in the following  
" manner:—A pulley fixed on the axis of the wheels gives  
" motion to an endless strap or band passing round another  
" pulley whose spindle is mounted on a frame attached to the  
" above-mentioned sliding supports, and placed above the frame  
" of the carriage. A chain attached to the spindle of this pulley  
" is connected to the framing of the carriage. By this arrange-  
" ment the revolution of the wheel is made to wind up the chain  
" and lift the carriage. Two or more spindles with pulleys are  
" employed, and two chains are attached to each spindle, so that  
" the carriage is raised simultaneously at four or more different  
" points. When the apparatus is not in use the straps are  
" thrown on to loose pulleys. To put the apparatus in action it  
" is only necessary to slip the straps on to the fixed pulleys.  
" This is effected by hand by turning a long spindle or drum,  
" having chains wound round it and attached to a sliding frame  
" or frames, which move the straps from one pulley to another,  
" or by any other suitable means. The pulley spindles carry  
" toothed wheels, and are all connected by racks, and by extending  
" these racks from one carriage to another with suitable con-  
" nections, an apparatus constructed as above described may be  
" put in action on each carriage in a train by one man. The  
" apparatus is applicable to waggon and engines and tenders, as  
" well as to other carriages."

[Printed, 4d. No Drawings.]

A.D. 1854, January 3.—N° 8. (\* \*)

CORLETT, HENRY LEE.—Caoutchouc springs.

Caoutchouc springs for locomotive engines and carriages have hitherto been formed of one or more rings or cylinders of caoutchouc having one hole through the centre, the transverse section showing a solid ring.

The improvement consists in perforating with a number of holes or cells of any shape a cylinder of vulcanized or prepared caoutchouc in the direction of the spring's action, rendering it more yielding, flexible, and elastic, and increasing the effective action and length of stroke with a more gentle initiatory action of the spring. Or the spring may be formed of a number of these cellular cylinders, introducing between each a disc of denser



caoutchouc, or a disc of any spun or woven fibrous material, gutta percha, cast or wrought iron. The metal casings or boxes in which the caoutchouc springs are generally enclosed consist of two parts, a cylinder and plunger of cast iron, with the back plate on which the spring impinges; the cylinder having an internal projection, and the plunger a corresponding external one, which when the plunger is inserted from the back of the cylinder, and the cylinder bolted in its place, renders it impossible for the piston to drop out.

[Printed, 1s. Drawings.]

A.D. 1854, January 5.—N<sup>o</sup> 26.

POMME, LÉON JOSEPH.—“ Certain improvements in reducing  
“ the friction of axles and axletrees of carriages.”

This invention has for its object “ to avoid the absorption of  
“ motive power caused by the friction of axles and axletrees in  
“ the axle boxes and bearings of railway carriages and other  
“ vehicles used on common roads,” and consists “ in substituting  
“ for the usual axle boxes and bearings a frame formed of two  
“ side plates united at the top, and having between them two  
“ cylindrical rollers which rest upon the neck or journal of the  
“ axle. These rollers are of a larger diameter than the axle, and  
“ serve as antifriction rollers.”

“ The frame is moveable, and causes the two rollers to be in  
“ constant contact with the axle or axletree of the vehicle.”

An arrangement is described in which two antifriction rollers are used, each of the rollers being held suspended by its trunnions between the two plates of a certain frame, “ within which they  
“ turn freely without coming in contact,” a clip and spring also aiding the action of the apparatus. The connection of the frame with the clip and spring “ may be disposed as a joint.”

In order to lubricate the axes of the antifriction rollers, the patentee perforates the head of the trunnions as far as the axes, the latter being thus supplied with the lubricating matter. And in order to prevent the oil from escaping, the openings of the trunnions are closed by an air-tight metal stopper or spring.

[Printed, 6d. Drawing.]

A.D. 1854, January 9.—N<sup>o</sup> 49.

GARFORTH, WILLIAM, and GARFORTH, JAMES.—“ Certain  
“ improvements in mechanism or apparatus for retarding or stop-

“ ping the motion of locomotive engines and other railway carriages.”

‘This invention consists in an arrangement of mechanism whereby all or a portion of the weight of a locomotive railway engine may be taken from off the wheels and transferred to supports which will rest and slide on the rails when the locomotive engine is in motion, and thus retard and stop it, the mechanism being actuated directly from the force of steam, or other elastic medium, or by water, acting upon two or a series of pistons for that purpose.’ Different modifications of the invention are described, but the essential feature of the invention in all cases consists in the application of inverted cylinders, furnished with pistons, at the lower ends of the rods of which are “ shoes,” or breaks, which, on the admission of steam above the pistons, are forced down upon the rails, and so reduce the pressure of the engine wheels upon such rails; or, if thought requisite, raise the wheels altogether out of contact with the rails. Instead of steam, however, springs may be used to act upon the pistons, or air, or water, or any other convenient elastic medium.

The patentees state that although the invention may be applied to carriages as well as engines, they do not consider the application to carriages as being advantageous, for which reason they confine their claim to the application thereof to engines.

[Printed, 10*d*. Drawing.]

A.D. 1854, January 13.—N<sup>o</sup> 87. (\* \*)

EASSIE, WILLIAM.—(*Provisional protection only.*)—“ Improvements in trucks used on railways.” The invention consists in “ improving the pole used for the purpose of connecting trucks used on railways for the carriage of timber, &c., ” “ by providing such poles with springs of india-rubber or other suitable elastic material, so that the force of the shock occasioned by sudden starting or stoppage of the train or otherwise may be prevented from injuriously affecting the said poles, and to save in wear and tear of material, and increase the security of the load, while also maintaining a condition of elasticity in the relative parts of the mass (load and trucks), and tending to preserve the original fixity of the load and entirety of the connecting pole, which is liable to breakage on strain or shock while not protected with the elastic springs aforesaid.”

[Printed, 4*d*. No Drawings.]

A.D. 1854, January 16.—N<sup>o</sup> 98.

NEWALL, JAMES.—“Improvements in machinery or apparatus  
“for stopping or retarding the progress of railway and other car-  
“riages, and in the mode or method of connecting two or more  
“carriages with the said apparatus together.”

This invention relates to improvements upon the invention for which the present patentee obtained a patent on the 3rd of December, 1852, that invention consisting mainly in the application of a lever, acting on the break shaft in such manner “that  
“when it is lifted up it detaches the break blocks from the  
“wheels, and when it is allowed to fall down it forces the block  
“to the periphery of the wheels by its own weight or gravity,  
“thus being partially self-acting.” The mode of raising the lever, as there described, combines the use of a spring or springs, enclosed in a cylinder, a vertical rod, a rack and wheel, and certain longitudinal shafts, all of which are fully set forth, but in the present invention the apparatus is worked “from underneath  
“the carriages instead of the top,” this being accomplished by  
“fixing the longitudinal shafts under the centre of the carriages,” or as nearly so as may be convenient, the cylinders containing the spiral springs being placed near the bottom part of the end of the carriage, and the springs acting upon the break lever from the bottom of the cylinder instead of the top. In applying the apparatus to carriages and waggons, “where there is not sufficient height  
“of body or framework to fix the cylinder and frame on the  
“end,” the patentee fixes it under the waggon or carriage in a transverse position, and combines it with a bell crank lever, and, in the case of a single waggon or carriage, with a ratchet wheel and pawl, these arrangements keeping the breaks out of action when they are not required to operate. The invention includes arrangements for working the breaks either from the tender or from any carriage in any part of the train, as well as from the guard’s van or box, this being accomplished “by fixing the  
“ratchet-wheel on the tender, and conveying and uniting the  
“connecting shaft to the longitudinal shafts, either to the top of  
“the carriages or underneath them.” If underneath, the connecting shaft is passed through the centre of the tender; if on the top, it is carried upwards in a diagonal position.

Another part of the invention consists in the adoption of “other  
“modes of connecting the revolving shafts,” besides those

described in the Specification of the patent mentioned above. One of these modes includes the use of short rods or levers, so jointed together as to adapt themselves to the varying distance of one carriage from another, but still admitting of simultaneous rotary motion; this arrangement being applicable not only in the working of breaks, but also as a means of connecting one carriage or waggon with another, "instead of the chain usually employed." In this case four short rods are used, but another arrangement is described in which two only are employed, and a bell is so mounted in connection with this apparatus as to give notice to the engine driver when the breaks are brought into or taken out of action by the guard.

[Printed, 1s. 6d. Drawings.]

A.D. 1854, January 17.—No 107.

CROSSKILL, WILLIAM.—(*Letters Patent void for want of Final Specification.*)—"An improvement in the construction of "carriage wheels to run on railways and ordinary roads."

This improvement "consists in making the wrought-iron rim "or tire of two different diameters, so that the same wheels may "be worked on railways and on common roads without altering "the wheels." When running upon an ordinary road the wheel works upon that part of the tyre which is of largest diameter, and when running upon a rail, upon that which is smallest, the larger portion of the tyre then acting as a flanch, and preventing the wheel from leaving the rail.

[Printed, 4d. No Drawings.]

A.D. 1854, January 17.—No 111.

CORLETT, HENRY.—"Improvements in springs for railway "and other carriages and vehicles."

This invention consists in combining C springs with elliptical springs, or with plates or stays instead of the latter, "the former "being so applied and connected as to be brought into action in "a direction opposite to that of the latter, but simultaneously "therewith." Thus in applying the invention to bearing springs (for example), the elliptical springs or their substitutes are placed horizontally under the body of the carriage, the C springs being so connected to them as to occupy a vertical position, and the elliptical springs or the plates or stays used instead thereof "being "fixed at their centre part to the ordinary blocks or bearings

“ above and below for the carriage body and axle respectively.” Both the **C** springs and the elliptical springs or their substitutes “ may severally be formed of a single plate of metal, and united “ at their ends. A pair of the former may be placed on each “ side of the latter, and united to each other at their ends by “ means of cross screw rods, or bolts and nuts, or when a greater “ number of **C** springs are used, by rings or clips ; and these may “ again be connected or united to the elliptical springs by means “ of a piece of metal or other material extending from one of such “ screw rods to the other, and by screws (with nuts) passed through “ such piece of metal and the elliptical springs, or by other suitable mode of connection.” Such a combination of **C** springs and elliptical springs, or their substitutes, may be employed as a buffer spring, “ in which case rings, clips, or other suitable mode “ of connection will be employed in lieu of cross screw rods.”

[Printed, 8d. Drawing.]

A.D. 1854, January 28.—N<sup>o</sup> 210.

GRIST, JOHN.—(*Provisional protection only.*)—“ An improved “ break for railway and other carriages.”

This improved break consists of “ a small wheel or wheels, “ which may be brought to bear both against the running wheel “ or wheels of the carriage to be retarded or stopped, and against “ the ground rail or other bearing on which the carriage is travelling. The small wheel or wheels is or are to be mounted on “ an axis connected with an arrangement of levers or other “ apparatus, in such manner that the driver or guard may, when “ necessary, bring the break into or out of action.”

[Printed, 4d. No Drawings.]

A.D. 1854, January 28.—N<sup>o</sup> 211.

RAYMOND, MEAD TERRY.—(*Provisional protection only.*)—“ Improvements in apparatus for retarding and stopping trains “ of carriages on railways.”

This invention has for its object “ the interposition of a carriage “ between the locomotive engine and the train of carriages, in “ order to carry breaks and apparatus acting by elasticity, in “ such manner that the breaks will ordinarily be applied to the “ wheels when the train is at rest, and the breaks will only be “ removed when the locomotive engine has moved a determined

" distance in advance of the train, so that should the locomotive, after being in motion, be stopped, whether by accident or otherwise, the apparatus acting by elasticity will cause the breaks of the interposed carriage to be put on or brought into action, and retard the progress of the train, and bring it to rest, or nearly so, before it comes up to the locomotive engine; the ropes, chains, or bands by which the interposed carriage is connected to the locomotive engine will at the same time be wound or taken up by the apparatus acting by elasticity as the interposed carriage comes up to the locomotive engine. For these purposes bands of vulcanized india-rubber or metallic springs, either separately or combined, are used, both for putting on the breaks and for winding or taking up the bands, cords, or chains which connect the train with the locomotive engine."

[Printed, 4s. No Drawings.]

A.D. 1854, February 1.—N<sup>o</sup> 248.

MORTERA, AUGUSTIN. — (*Provisional protection only.*)—"Improvements in apparatus for stopping locomotive engines, wag-gons, or other vehicles on railways."

The inventor attaches to the engine and each carriage of a train a cylinder fitted with a piston and piston rod connected to the brake of such engine or carriage, each carriage being provided with a pipe communicating with the cylinder attached thereto, and the cylinder on the engine communicating with the boiler. The pipes of the various carriages are connected with each other and with the boiler of the engine by sliding joints, and by opening a valve provided for the purpose the engine driver may at any time admit steam into the whole of the cylinders, "and the brakes are thus put on," being "drawn off by springs or balance weights" when the pressure of the steam is removed. A "return pipe," communicating with those connected to the carriages, is passed from the last carriage back to the engine, conveying the steam which has been thus used to the chimney of the engine, or some other means of escape, this return pipe being provided with a valve which is closed when the brakes are to be applied, but stands open when they are "off," a small quantity of steam from the engine being allowed to pass continually through the pipes "to keep them and the cylinders hot."

[Printed, 4s. No Drawings.]



A.D. 1854, February 4.—N° 278.

NEWTON, ALFRED VINCENT. — (*A communication.*) — “Improvements in springs applicable to railway carriages and other uses.”

This invention relates to a novel mode of employing volute or coiled springs, “that is, springs formed of bars rolled up close in the form of clock or watch springs or other analogous form, with the view to obtain a greater amount of tension with a given weight of metal and within a given compass than by any other mode of application.” One part of the invention consists in sustaining the outer coil of such a flat volute spring by a case,” the patentee stating that “when this is combined with the application of the force in lines parallel or nearly so with the axis of the coil of the spring, by connecting the outer coil of the spring with one, and the inner coil with the other of the two bodies to be kept apart with the required elastic medium, the spring is thus rendered more efficient to resist the force applied to bend it from a flat to a spiral shape, for in so doing the tendency is to reduce the diameter of each coil, instead of enlarging it, as when the force is applied to flatten a spiral spring.” He also states that a much longer spring can thus be obtained within a given compass than by any other mode of application, and that such springs can be made at less cost, and be also readily restored when they have yielded under the force applied, “which is done by simply reversing them.”

Another part of the invention consists in employing such springs, “when combined with and acted upon by a conical surface or its equivalent, or one conical surface on each side, so that as the power applied in a line parallel, or nearly so, with the axis bends the spring the said conical surfaces or surfaces shall gradually come in contact with the edges of the coils and give them support, and thus reduce, by the gradual approach of the points of support, the length of the active portion in proportion to the weight or force applied, so that the tensile force of the spring increases in a much greater ratio than in any other known plan,” and reduces the extent of play required when the weight or force applied is liable to great variations, “as in railroad carriages.”

The springs may be made from either flat or otherwise formed

bars, and the conical surfaces may be used or dispensed with, as may seem desirable.

[Printed, 1st. Drawing.]

A.D. 1854, February 6.—N° 285. (\* \*)

FIRTH, BENJAMIN WRIGLEY.—(*Provisional protection only.*)—

“Improvements in the method of stopping railway trains, of working breaks on railway and other carriages, and of communicating signals from one part of a railway train to another.”

The inventor proposes—1. “To have an additional valve on the engine in any convenient position to act as a single whistle.”

2. “To convey a communication from the said valve by wire or other suitable material along each carriage under the eaves of the

roof or any other convenient position, so that the guard or person in charge of the train may have command over it.”

3. “To connect the said apparatus of such carriages together by means of couplers shewn in the drawing, which couplers are so constructed in the joint as to allow for the curvature of the train.”

4. “Acting upon the said valve so as either to give the signal whistle or to shut off the steam.”

5. “To use the the same apparatus to apply the break blocks to the wheels of the said

carriages by means of vertical levers attached to the said communication and connected to the break levers.”

[Printed, 2d. Drawing.]

A.D. 1854, February 10.—N° 320.

BROWN, DAVID, and BROWN, JOHN.—“An improvement or improvements in the construction and manufacture of axles for railway and other carriages.”

According to the first part of this invention a hollow axle is formed by placing together the edges of two semi-cylindrical pieces which have been previously prepared by rolling, and then uniting such edges by welding; in some cases other semi-cylindrical pieces being placed outside these, the joints, however, of the second pieces not being directly above those of the first, and the whole being welded together. A cylindrical core may be introduced inside a hollow axle thus formed and united thereto by welding, a solid axle being thus produced, the patentees preferring in this case to form the hollow axle in the first place with longitudinal internal ribs, the core being grooved to correspond therewith. By

using short cores axles may thus be made partly hollow and partly solid, being solid at the ends and middle (for example) and hollow in the other parts. A machine is described as being applicable for welding together the different parts of which these axles are composed, this machine consisting essentially of two parallel rollers upon which the axle rests while under operation, and two upper parallel rollers which are pressed down upon the axle by screws, these latter rollers being mounted in bearings capable of sliding up and down, and provided with weighted levers by which the rollers are raised when the pressure of the screws is removed. The number of rollers used may be varied, and they may, if desirable, be of such shape as to form necks on the axles.

[Printed, 10d. Drawings.]

A.D. 1854, February 10.—N<sup>o</sup> 327. (\* \*)

RIVES, JACQUES.—“Improvements in railways and railway “carriages.”

The invention has for its object the reducing the amount of power necessary for propelling trains on railways, and more particularly on the curved portions of such roads, and at the same time diminishing the risk of accidents, and this is done by rendering the wheels independent the one of the other by mounting one or both of them on tubes which slide on to but turn independently of the axle, and in this way the lubrication of the rubbing parts is improved, the oil being supplied to the space between the axle and the exterior tube. The passages round curves are rendered more easy and safe by arranging the axles in such a manner that they may be set at any angle the one to the other, by means of screws or other suitable instruments which are acted on by an arm which comes in contact with guides fixed in the roadway, and which guides correspond with the curve at the commencement of which they are placed; and as the application of these improvements renders necessary considerable steadiness in the train the carriages are connected together by means of bars, which proceed from one side of one carriage to the other side of the other, and vice versa, and the steadiness is increased while running by imbedding in the process of rolling a bar of steel in the tyre of the wheels, and in the rails on which they run. The carriages are also so connected together that the sudden stoppage or deviation from the right course of the front carriage, by acting on a bar

projecting from the carriage behind, forces a skid under the wheels of the hinder carriage.

[Printed, 1s. 4d. Drawings.]

A.D. 1854, February 10.—N° 330. (\* \*)

**BRIDGES, HENRY.**—(*Provisional protection only.*)—"Improvements in buffers for railway carriages or waggons."

It consists "in enclosing a coiled metallic, india-rubber, or other spring in a cylindrical box or case, which is made to slide within an outer cylinder or case, whereby the inner cylinder will be supported and prevented from bursting or bulging when any undue strain is put upon it." "The buffer head is secured to a rod or bar which passes through the two cylinders to the frame of the carriage, and holds the several parts together, but they may be quickly taken asunder by removing a cross pin or bolt, which retains the rod or bar in its place and prevents it from being withdrawn until the cross pin is taken out, after which the parts may easily be taken to pieces and repaired if required."

[Printed, 4d. No Drawings.]

A.D. 1854, February 11.—N° 337.

**JENNINGS, JOHN, the younger.**—"Improvements in brakes for railway and other carriages."

This invention consists "in attaching a spring to a brake in connection with the buffers of a railway train, so that when the steam is shut off the momentum of the carriages behind the engine acts upon the buffers and springs, and the brakes are thereby caused to press upon the wheels, gradually stopping the train without inconvenience to the passengers, and with a considerable saving of time in stopping the trains at the stations. One of these brakes is applied to every wheel, or as many as may be required to stop the train in case of sudden danger."

The arrangements connected with the invention are very simple, the main feature of the invention consisting in all cases in the employment of a spring connecting the brake with the buffer rod, the result being that on the buffer rods being pressed inwards the brakes are forced against the wheels, a "counteracting spring"

being used to remove the brakes from the wheels when the action of the buffer rods ceases.

The invention is mentioned as being applicable to vehicles drawn by horses, as well as to vehicles for railways, the arrangement being in the former case such that the "backing action of" the horse in descending a hill causes the break to bear upon "the wheels," while in "conveyances of two wheels" a slide will be employed, which will allow the body of the vehicle to adapt itself to the ascent or descent of hills, the body moving backwards in one case and forward in the other.

[Printed, 8d. Drawing.]

A.D. 1854, February 14.—N° 360.

WILSON, GEORGE.—(*Provisional protection only.*)—"An improvement in axle boxes."

The object of this invention is to facilitate the removal of brasses from axle boxes when worn, and requiring to be replaced or repaired. To this end, instead of making the brass bear directly against the top of the box, as is usually the case, the inventor interposes between the two a filling piece or wedge "suitably shaped to retain the brass in position by means of a" "lip or other projection, which, bearing against the brass, will" "prevent it from moving in the direction of the length of the" "axle. The filling piece itself is retained in position by reason" "of the removeable cap or cover of the axle box bearing against" "its outer end. In order to withdraw the brass it is only" "necessary to remove the cover and lift the carriage slightly, so" "as to relieve the filling piece from pressure; the filling piece" "being then drawn out the brass may be readily lifted out of the" "box and replaced by a fresh brass. The filling piece is then" "placed over the brass and the cover of the box is re-attached."

[Printed, 4d. No Drawings.]

A.D. 1854, February 17.—N° 383.

SMITH, GEORGE, junior.—"Improved machinery for retarding" "and stopping railway carriages."

The chief object of this invention "is to distribute equally over" "a set of connected brakes the pressing power imparted thereto" "by the brake rod," this being mainly effected by connecting the brakes to "bow springs hung on centres," for which, however, in

some cases, coiled springs carrying pendent rods are substituted. In one arrangement a horizontal rod, which may be actuated by suitable means, is employed to bring the brakes into action, this rod operating upon the brakes through the medium of a bell-crank lever, from the shorter arm of which is suspended a rod having at its lower end a crosshead or shackle, this, again, being connected through the medium of links so arranged as to form a kind of parallel motion with the breaks, the latter being suspended, moreover, from the opposite ends of a bow spring carried by a short arm or link mounted on a pivot. The effect of this arrangement is that on the brakes being pressed against the wheels the spring will move slightly either to one side or the other should there be any inequality in the thickness of the brake blocks, or in the action of the other parts, for which it may be desirable to compensate.

Another arrangement is described in which friction straps lined with wood are employed to act upon friction wheels attached to the running wheels of the carriage, the horizontal rod in this case acting directly upon one end of the friction strap, both ends of the strap, however, being suspended by links from a bow spring, mounted as in the arrangement mentioned above. Another arrangement is described in which the two ends of a friction strap are connected to the ends of a short crosshead or shackle, mounted on a pivot carried by a vertical rod which passes upwards through a spiral or coiled spring, this arrangement being equivalent to that of the suspended bow spring. To attach friction wheels or drums to the running wheels of a carriage the patentee employs clamping bolts, which pass through lugs on the drums and clip the spokes of the carriage wheels.

[Printed, 1s. 4d. Drawings.]

A.D. 1854, February 18.—N<sup>o</sup> 389.

**HARRIS, PETER GEORGE.**—(*Provisional protection only.*)—"Improvements in locomotive engines."

According to this invention the fore part of the framing of a locomotive engine supports the engine and a part of the weight of the boiler, and the hind part the tender and the other part of the weight of the boiler. These two parts are coupled together by means of a strong axis, placed between the hind axle of the fore part and the fore axle of the hind part. The fore part is pro-



vided with an inside and the hind part with an outside frame, the fire-box being so situated within the latter as to allow the fore part, "and consequently the boiler, to revolve on the axis in accordance with the sharpest curve of the railway."

"The fore part may contain three or only two axles, and the axis ought to be situated at such a point that both parts of the locomotive may, on passing any curve of the line, occupy the same relative positions as they would do if independent of each other."

"The tanks are placed on both sides along the cylindrical part of the boiler, upon a platform resting upon the driving wheels, in order to increase their adhesion. The wheels of the fore part are coupled in the usual way by means of coupling rods. If, however, increased adhesion should be required, the hind axle of the fore part may be coupled to the front axle of the hind part by means of toothed wheels, the four wheels of the hind part of the locomotive being coupled by ordinary coupling rods."

The essential features of the invention are, the arrangement by which "the weight is distributed over a long portion of line," the engine and tender resting altogether upon five pairs of wheels, and the "articulation" of the fore and hind parts of the locomotive.

[Printed, 10d. Drawings.]

A.D. 1854, February 18.—N<sup>o</sup> 390.

MORRISON, WILLIAM.—"Improvements in railway wheels."

This invention "relates to the formation of cast-iron railway wheels, each in one solid piece, with a concentrically corrugated disc or body portion instead of spokes. The disc, the rim or tyre, and the nave or boss, are all cast in one piece, either with a chill for the tyre or not. The corrugations, which may be of various transverse sections, and either simply undulating, or angular, or composite, are concentric with the wheel's nave, and are formed in the plane of the wheel's motion, or at right angles to the axle. This system of construction ensures the obtainment of a sound wheel, running smoothly and easily when at work."

If desirable, "holes or spaces" may be left, or afterwards formed

in the disc, for the purpose of rendering the wheel lighter than it otherwise would be.

[Printed, 6d. Drawing.]

A.D. 1854, February 21.—N° 408.

**RAMSBOTTOM, JOHN.**—"Improvements in welding."

These improvements are effected "by giving a reciprocating rubbing motion to the parts to be welded," and "combining pressure, and, if requisite, percussion thereto, whereby pieces or parts of pieces of iron or steel may be firmly united in less time and more securely than heretofore."

This invention is set forth as being particularly applicable "for welding the tires of railway wheels," different modes of carrying out the invention being, however, described, in one case a bent tire bar being laid upon a bed which is bolted to a foundation plate, and operated upon by "gabs" through the medium of excentrics; certain wedges, slides, screws, levers, and other mechanism also aiding in the operation. In this machine the "reciprocating rubbing motion" is "up and down," but another arrangement of machinery is described in which the reciprocating rubbing motion "is round a centre." The patentee states, however, that he does not limit himself to "the precise forms and arrangements shewn and described, as the same may be varied to suit the particular shape of the articles to be welded."

[Printed, 10d. Drawing.]

A.D. 1854, February 21.—N° 419.

**DIXON, ADAM.**—"Improvements in railway axle boxes and bearing springs."

This invention consists, firstly, "in the division of the bearing surface of the brass or metal step into three or more distinct portions, one such portion or strip being directly over the axial line of the journal, whilst the other two are disposed so as to embrace the lower portion of the journal, each being set at an angle of about one hundred degrees with the top brass. In this way the journal is embraced closely by three narrow strips or ribs of metal, running the entire length of the bearing, the upper strip being permanently set in the axle box, whilst the two lower ones are adjustable by screws or otherwise as the top piece wears. This arrangement ensures the complete contact

" of the lubricating matter with the rubbing surfaces, and  
 " prevents the usual disagreeable shake and rattle of the  
 " bearings."

Secondly, the invention relates " to the supplying of the grease  
 " in axle boxes by means of drawers, each drawer or grease  
 " chamber being fitted with a self-acting stamper or presser for  
 " squeezing the lubricating matter against the journal surfaces.  
 " The presser is set on a hinge, and when the drawer is pulled  
 " out the presser opens upwards by the action, whilst on the  
 " return of the drawer the reverse movement occurs, and the  
 " grease is thus pressed down to the rubbing surfaces."

Thirdly, " to a hydro-pneumatic bearing spring, composed of  
 " one or more metal cylinders arranged with one or more upper  
 " chambers for the retention of air and water, or either of them,  
 " as well as one or more lower chambers for a similar purpose,  
 " both chambers having pistons or rams fitted to them for the  
 " purpose of receiving the spring pressure of the retained water  
 " and air, and conveying such pressure to the axle boxes. A good  
 " arrangement of this kind is that wherein an upper small cy-  
 " linder has bolted to its face or lower end a large cylinder. The  
 " smaller cylinder receives the air pressure, whilst the concentric  
 " ring between the two diameters receives the pressure of the  
 " water in the lower chamber. The retention of the water is  
 " secured by a leather embraced between the two rams, and pass-  
 " ing into the joints of the two cylinders. Such springs may  
 " be used with any kind of axle boxes. It is obvious that these  
 " improvements may be used either separately or in combination  
 " with each other."

The invention is minutely described, the patentee mentioning  
 the application of two cylinders " arranged to act together as a  
 " compound fluid spring " in the manner described.

[Printed, 10d. Drawing.]

A.D. 1854, February 23.—N<sup>o</sup> 439.

STOY, HUGH.—(*Provisional protection only.*)—" Stopping of  
 " engines and carriages on railways, and also vehicles of every  
 " description on common roads."

The objects of this invention are not only to afford means of  
 stopping engines and carriages on railways, but also to prevent  
 the slipping of the driving wheels of engines, and the drawing of  
 trains off the lines of rails by such engines.

The invention is set forth in an extremely confused and unsatisfactory manner. One part of the arrangements apparently consists in the application of a long horizontal bar provided with a buffer head at one end and a rack at the other, and so connected with the break apparatus that the latter will be brought into action either in case of a collision or by the guard moving a handle and certain mechanism with which the rack is connected. Buffers of the ordinary character appear to be also arranged so as to act upon the same break apparatus. The driving wheels of an engine are also described as being by some means lifted off the rails, and their rotation then continued by means of cranks and connecting rods, from other wheels in front of them, the driving wheels thus acting as "flies," but for what purpose is not stated, large breaks passing over these wheels, which seem to be connected to screws and winches by which they may be worked. Breaks for carriages for common roads are to be actuated by means of a lever, which may be operated upon "by the hand or foot of the driver on the box."

[Printed, 6d. Drawing.]

A.D. 1854, February 24.—N° 445. (\* \*)

VALLETTE, DÉSIRÉ.—(*Provisional protection refused.*)—"The imitating and ornamenting of wood by means of a new process, consisting of a paste to be applied to furniture generally, panelings either for the interior decoration of houses or ships, frames, mouldings, doors, and, indeed, all that may be considered ornamental wood work; this paste may also be applied upon zinc and iron in every state." "This composition is capable of receiving every possible tint or colour, mahogany, citron wood, palissander, ebony, old oak, &c. &c. It is composed of glue (*colle de peau ou de Flandres*), whitening, lamp black (or almost any sort of black), and English cement. The different colours are applied in a paste upon the wood, and by means of a mould the form, model, or contour desired can be easily obtained."

"It is to be applied to the articles above-mentioned, with the addition of railway carriages, pianofortes, and all modelled or ornamental woodwork."

[Printed, 4d. No Drawings.]

A. D. 1854, February 25.—N° 467.

PLANTIN, ALEXANDRE.—(*Provisional protection only.*)—"Improvements in the arrangements and combination of apparatus for stopping and retarding railway trains and carriages."

This invention relates to apparatus by which the breaks of all the wheels of a railway train "may be simultaneously applied by means of the rotation of the wheels of the carriages." The breaks "are suspended on axes over the wheels, and by means of springs they have at all times a tendency to stand off from their respective wheels," and they are caused to act upon such wheels by means of eccentrics, "the axes of which are put in motion by means of longitudinal axes or shafts with screws or worms fixed thereon, which when requisite are caused to take into and drive toothed fixed wheels on the axes of the eccentrics. There is a longitudinal axis running from end to end of a train of carriages, such axis being in part capable of being coupled together when a train of carriages is made up. This axis is cranked at intervals, and the cranks carry suspended bearings for the several axes which have screws or worms therein, by which means the screws or worms ordinarily are out of gear with the toothed wheels on the axes of the eccentrics, and the toothed wheels on the axes carrying the screws or worms are out of gear with the screws or worms which are on the axes of the carriages." The result of the whole arrangement is that the guard of the train, by means of suitable gearing, may cause the cranked axis at any time "to rotate partly round, which will cause all the screws or worms and the toothed screw wheels to come into gear, and the rotation of the wheels of the carriage as the train continues its progress will cause the breaks to be pressed more closely against their respective wheels."

[Printed, 4d. No Drawings.]

A. D. 1854, February 28.—N° 485.

MALLET, ANDRÉ LOUIS.—"Improvements in apparatus to destroy the effects of shocks."

This invention consists of an apparatus in which a plunger or solid piston passes through a cupped leather into a chamber which contains sufficient liquid to completely cover the end of the

plunger, "which works horizontally, and which is thus kept tight. "The space in the chamber above the level of the liquid contains "air or gas, which is compressed by forcing in the plunger, and "which it again forces out when the pressure is removed."

"In the side of the chamber is a valve, through which the "liquid and the air or gas is forced into the chamber by means "of a force pump when the chamber requires replenishing."

The details of the invention may be varied, and the patentee remarks that such apparatus "may with great advantage be "applied as buffers to railway carriages."

[Printed, 6d. Drawing.]

A.D. 1854, March 2.—N° 510.

BARCLAY, ANDREW.—"Improvements in lubricating shafts "and revolving metallic surfaces."

This invention relates to "so arranging the journal bearings of "horizontal shafts that the bearing surfaces may be kept uni- "formly lubricated, whilst the oil or lubricating fluid is pre- "vented from escaping from the frictional surfaces, and oil once "supplied to the bearing remains in good lubricating order "until used up by wear." According to one modification of the invention the shaft is furnished with a projecting collar, of the length of the intended bearing, the brasses being formed to correspond therewith. Each brass extends beyond each edge of the collar, and is slightly turned out or recessed, so that the angles of the collar shall be slightly overlapped by the brass, the brass being hollowed out beyond such overlaps, so as to form an annular cup for the reception of the oil, such cup being "well "overhung," and brought close to the plain part of the shaft, in order to prevent the entry of dirt. "The inner face of the "upper brass is inclined downwards from each side towards the "centre, instead of being square across, as usual; and the result "is that the oil supplied from the top in the usual way is well "spread over the frictional surfaces, and, flowing down it, is "caught by the annular cups of the brasses, and retained therein "for continued use. Or the same effect may be obtained by "bevilling the inner edge or edges of the lower brass alone, the "upper brass being made square across as usual. The continued "use of the oil is effected by the action of the bearing collar on "the shaft; for, as this revolves, its edges gather films of oil



“ from the annular cups, and bring up the oil so collected to the top brass. There the revolving collar edges apply the oil to the corresponding edges of the upper brass, and, owing to the duplex interior incline thereon, the oil is thence conveyed towards the centre of the bearing, whence it is well distributed over the whole rubbing surfaces. Instead of a plain collar projection, other forms of journal may be employed with the same result; or a couple of rings may be set fast on the shaft, so as to carry up the oil in a similar manner.”

[Printed, 8d. Drawing.]

A.D. 1854, March 4.—N° 527.

DE BERGUE, CHARLES. — “Improvements in apparatus for bearing and buffing purposes.”

This invention relates, firstly, to the axle boxes of railway and other axles, “and consists in making or constructing the brass or other suitable metal bearing or step so that it shall itself form and constitute the upper and principal portion of the axle box, and that the grease cup shall by that means be formed in and become part of the actual brass or bearing, and that it may also be made to form in itself the requisite projections at the back and front of the box, which serve in connection with the other parts to enclose the journal, and to protect it from mud, dust, &c. &c.”

Secondly, to the use and application of axle boxes “constructed as firstly above set forth,” and consists “in connecting or securing two or more of such axle boxes together (in a direction at right angles to the axles to which they are to be applied) by bars, plates, rods, or other equivalent or suitable means, so as to maintain them in the proper position.”

Thirdly, to the spindles, rods, guides, or framing of helical or spiral or disc metal springs, this part of the invention consisting in “the adaptation to such spindles, rods, guides, or framing of indian-rubber, leather, or other suitable material, for the purpose of allowing a certain amount of play, and of lessening noise and vibration.”

Fourthly, to the cases or framing of that description of buffer or buffing apparatus for carriages in which vulcanized india-rubber or metal springs are employed to afford the requisite elasticity, and are enclosed in telescopic or sliding cases or fram-

ing; this part of the invention consisting "in so casting or making the two principal pieces or parts of such cases or framing as that the one may not only slide within the other, but that they may also be properly held together by the form of the pieces or parts themselves, instead of depending upon a central rod or bolt for the purpose."

[Printed, 1s. Drawings.]

A.D. 1854, March 7.—N° 543.

JOHNSON, JEREMIAH.—(*Provisional protection only.*)—"A new stop for railway and other carriages."

In this invention strong ratchet wheels are connected to the wheels or axles of railway or other carriages, there being upon pivots above these strong hooks or catches, which are allowed to fall into contact with the teeth of the ratchet wheels and so prevent the wheels of the carriages from revolving when it is desired to stop their progress, the hooks or catches being connected to short chains attached to rods capable of sliding backwards and forwards, and so lowering the hooks or catches or raising them from the ratchets. These rods, in the case of a railway train, are connected by hooks and springs, each carriage having its own rods, and they may all be moved simultaneously by means of a lever and certain stud wheels furnished with chains, in conjunction with a lower series of rods, &c.; or these lower rods and the lever and stud wheels may be dispensed with and the hooks or catches be allowed to fall by the withdrawing of a pin, which at other times so operates upon the upper line of rods as to keep the catches raised. In the case of a carriage for common roads the apparatus for raising and lowering the catches is placed inside such carriage.

[Printed, 6d. Drawing.]

A.D. 1854, March 8.—N° 554.

BARNETCHE, LOUIS JEAN.—(*Provisional protection only.*)—"Improvements applicable to the prevention of accidents on railways."

One part of this invention relates to a mode of disconnecting a locomotive engine and its tender from the rest of the train when in motion. For this purpose, instead of the chains usually employed to connect the tender with the luggage van the inventor

provides "hollow cylinders into which solid cylinders are fitted, " one set being attached to the van, and the other to the tender " (or instead of these cylinders bars of iron might be employed)." Through these are passed keys or bolts which are connected to a lever, and by moving this lever and withdrawing the keys or bolts from the cylinders (or bars) the engine and tender will be disconnected from the van and the rest of the train. The van is furnished with a platform, placed "above the flooring of the " tender, and running upon friction rollers in a groove," which will preserve the men who stand thereon to effect the disengagement from being carried on with the tender.

Another part of the invention relates to the application of breaks to the wheels of railway carriages, and is described under various modifications. In one case each carriage is furnished with an iron rod, placed longitudinally underneath it, the rods of the different carriages of a train being coupled together, so that all may be turned simultaneously on their axes, when so turned being acted upon by slotted nuts mounted on the carriage axles, which operate upon the rods through the medium of "stops" fixed thereon, and so cause the breaks to be pressed against the wheels by means of suitable apparatus connected with the rods. The stops on each rod occupy " $\frac{1}{3}$ ths of its circumference," and they vary in number "according to the series to which the break is to " be applied; thus, 3 stops for the last carriage, two for the " middle one, and a single stop for the first series," the result of this arrangement being that on the rods being turned, the breaks of the "last set" of carriages will be first brought into action, " then the middle breaks, and lastly the front ones." Instead of working the breaks from the axles they may be worked from the wheels, through the medium of sliding rods provided with arms or levers carrying break shoes, and the apparatus may be provided with an indicator, "which shews the degree of pressure exerted, " or the extent to which the stops penetrate the mortises." Or the breaks may be actuated "indirectly through the wheels and " axles," in which case the axle acts as "the motive power," being furnished with a screw thread and a nut, which being allowed to travel therein will apply the break through the medium of a lever arm, each nut being retained in position at other times by a rod having a hook thereon. In another case a screw or snail on the axle may be made to move a lever, and thereby a rod carrying a break shoe, the lever being raised out of contact with the

snail when not required to operate. In another case each axle carries a sleeve or hollow shaft provided with stops, which are made to act upon certain "cast-iron pieces" provided with chains when the breaks are required to operate, the sleeve being then forced by a spring into "gear" with those pieces, and the chains being connected with apparatus by which the breaks are pressed against the wheels. In another arrangement skids or shoes are so connected to certain rods and chains, that on the disengagement of a hook they are allowed to fall upon the rails "under the" wheels, and are made to slide along the rails until the carriage "is stopped by the friction."

These arrangements are set forth at some length, but in a somewhat clumsy and unsatisfactory manner.

[Printed, 4d. No Drawings.]

A.D. 1854, March 10.—N° 583.

LEFÈVRE, DESIRÉ PARFAIT.—"An improved railway brake."

This invention consists of a mode of stopping railway trains "by the interference of the engine driver only, and in such manner that the vis viva acquired by the train is made use of for bringing it to a standstill in a shorter time than by the brakes now in use. The way and means to effect this is by applying simultaneously brakes to all or most of the carriages of the whole train, and stopping or breaking the engine and tender in front of the train by the usual means, the brakes of each carriage being forced up against the wheels by the impact and pressure of the front buffers of each carriage against the buffers of the following carriage." The patentee states that to make this impact more effective for the purpose of breaking he throws the front draw spring out of gear with the under frame of the carriage, so that the buffer rods, which are most generally acted upon by the ends of the draw spring, are thus set free to be pushed back and to push back the spring. Each preceding carriage having slackened its speed from the tender backwards, will thus no longer draw the spring, but push it back by means of the buffer rods; and a rod or rods being suitably linked to the spring or to the draw bar head, will then act upon a brake shaft in the usual manner. In order to lock the head of the draw bar with the middle longitudinal beam of the railway under frame, there

is a vertical drop bolt let into the draw bar head, which bolt can be lifted so as to move backwards and forwards in a slot in the middle beam of the carriage under frame. This bolt being weighted drops into its place again as soon as the draw bar is pulled forwards, when the draw spring again acts as buffer spring. The bolt is actuated by means of a rod mounted on the tender within reach of the engine driver, which rod "communicates by means of levers, connecting rods, quadrants, and connecting chains between each carriage and the next with the weighted vertical bolt hanging from a bracket fixed on the draw bar head," and by pulling at this rod the draw spring is liberated, and the buffers set free. "To the frame carrying the buffer rods are linked rods at each side of the carriage, by means of which, and a cross shaft centered in the middle of the carriage, the brake blocks are put to as usual." The details of the invention are minutely described.

[Printed, 10d. Drawing.]

A.D. 1854, March 14.—N° 609. (\* \*)

**RUSSELL, FREDERICK.**—(*Provisional protection only.*)—"Improvement in apparatus for clearing obstructions on railways."

This invention "consists in fitting to the front of the engine or first leading carriage or truck of the train a peculiar shield, made rather pointed or sloping back from the centre on each side. This shield is nearly the width of the line, leaving a clearance of about two inches on each side between the edge of the shield and the inner side of the rails. A suitable framing is fitted to the front of the engine or carriage to receive this shield, which constitutes the snow clearer, acting as a plough to cut through the snow." For removing obstructions on the rails themselves "a pair of spring hinged guards or scrapers are employed, fitted to each side of the engine or carriage framing, and situated immediately over the rail; these guards or scrapers placed angularly over the rail are so made that they may give slightly either way should any fixed obstruction occur, as the starting of a joint in the rails for example. The bottom of the guard, or that nearest the rail, is also made moveable, being connected by vertical slides to the upper portion, and is kept down near the rail by a curved spring."

[Printed, 4d. No Drawings.]

A.D. 1854, March 15.—N° 626.

PEAD, GEORGE, and WYATT, CORNELIUS. — (*Provisional protection only.*)—"An instrument for readily ascertaining the "wear of the bearings of railway carriages."

This instrument is described by one of the above-named inventors as follows:—

"Through a circular hole formed in a flat piece of metal I pass  
" a cylindrical-shaped piece of metal, upon which I inscribe, scribe,  
" or form marks or divisions representing inches and parts of  
" inches, and in using this instrument for the purposes of this  
" invention I insert the lower end or point of the before-men-  
" tioned cylindrical-shaped piece of metal into that hole, or one  
" of those holes in the bearing brasses through which the grease  
" passes for lubricating the said bearings and journals upon  
" which they rest, and I press down the aforesaid piece until it  
" touches the journals, and then observe which of the divisions  
" the upper part of the piece of metal through which said divided  
" piece comes opposite to, and by knowing the average thickness  
" of the bearings when new I am thus enabled from time to time  
" to ascertain and measure to a nicety the amount of wear which  
" has taken place therein."

[Printed, &c. No Drawings.]

A.D. 1854, March 28.—N° 720.

ROWLAND, ELLIS, and ROWLAND, JAMES.—(*Provisional protection only.*)—"Improvements in the manufacture of certain "metallic springs."

This invention relates to the construction of "helical" springs suitable for buffers, cushions, and other purposes, and consists  
" in casting such springs in sand or moulds in the ordinary  
" manner in which iron castings are usually done, instead of  
" forming or cutting such springs out of a broad ring of metal,  
" by turning and cutting the same in the lathe as commonly  
" effected."

The inventors state that by casting such springs "at once com-  
" plete in the mould" they find them "much more elastic and use-  
" ful and of better quality, in consequence of all their surfaces re-  
" taining the perfect 'skin' of the metal, instead of having the cut  
" or turned surfaces of those springs which have heretofore been  
" made from rings, in which this outer 'skin' is necessarily



" removed by the operation of turning and cutting the rings to form the springs required."

[Printed, 4d. No Drawings.]

A.D. 1854, April 4.—N° 770. (\* \*)

PARKINSON, GEORGE SEABORN. — (*Provisional protection only.*)—"Improvements in railway breaks."

This invention "consists in the construction of an electro-magnetic break made to act on the axles of the carriages as well as on jams or ordinary breaks, placed between every pair of wheels where required." To a strong iron casing, clamped over the axle, is attached "a powerful double faced hook;" "outside the casing is fixed a wooden wheel," having its circumference overlaid by two narrow tramways or guides of soft iron." An electro-magnet, suspended by a spring, is carried round by the tramways or guides when an electric current excites it, so as to bring the ring of a chain attached to it into the hook. The other end of the chain is attached to a lever, which jams the breaks against the wheels. The galvanic battery is in one of the carriages of the train or on the engine, and insulated wires proceed from it along the carriages to the magnets, where shorter wires branch off. "To release the hook and break, the carriages must be moved slightly backwards."

[Printed, 4d. No Drawings.]

A.D. 1854, April 4.—N° 776.

McCONNELL, JAMES EDWARD.—(*Provisional protection only.*)—"Improvements in wheels, axle boxes, and brakes for railway carriages."

That part of this invention which relates to wheels consists in forming each of such wheels from a single piece of metal, by means of "pressure in moulds," such pressure being obtained in any convenient manner. As regards axle boxes, the invention relates to boxes such as those forming the subject of a patent obtained by Henry Vigurs, on the 4th of November, 1851, and consists in forming the washer, which fits upon the shoulder of the axle and retains the grease in the box, "of wood or any other material suitable for the special purpose for which it is designed." As regards brakes, the invention consists in forming iron shoes or frames to hold the wood or other material of

which the brake block is formed; or in composing the brakes of alternate blocks or layers of wood and of metal or other suitable materials.

[Printed, 4d. No Drawings.]

A.D. 1854, April 8.—N° 834.

GILBEE, HENRY.—(*A communication.*)—"Improvements in the "construction of axle boxes and axle bearings."

This invention relates, firstly, to the employment of anti-friction rollers inside the bearings of axles and shafts. An arrangement in which the invention is applied to the axle box of a railway carriage is described, in which the axle is entirely surrounded by anti-friction rollers, the latter being each composed of a central axis, and three tubular portions which are placed thereon in a line with each other. These tubular portions are not all of the same diameter, the central portion of one roller being larger than those at the ends, and alone coming in contact with the axle, while the next roller has the end portions larger than that in the middle, and so on alternately, the smaller portions being of brass. At the lower part of the axle box is an oil chamber, which communicates with the box by means of an opening provided for the purpose, and the rollers are thus themselves lubricated, and also carry up oil for lubricating the axle, a portion of such oil passing into a recess above the axle through small holes provided for the purpose. A lower reservoir may also be formed to receive oil if the supply be excessive, and suitable screw plugs be arranged for the discharge of oil from the apparatus.

The invention is also described with reference to the axle box of an ordinary carriage, and likewise to the journals of a shaft working in stationary bearings, the main features of the invention being, however, in each case the same as those mentioned above.

[Printed, 1s. Drawings.]

A.D. 1854, May 5.—N° 1007.

MARTIN, ADRIEN GEORGES AMANT, and LEFOL, CASIMIR.—"Certain improvements in the manufacture of iron wheels."

This invention consists in making wrought-iron wheels, "especially for railways," of "one single piece," instead of making them in different parts, to be afterwards united. The manner in which the patentees carry the invention into effect is

“ by compressing the welding, hot bloom, or plate of iron required for the wheel between two dies or swages, which when put together at the proper distance leave an empty space having the form of the wheel. One of the dies or swages may be on the face of the anvil, or it may be in a piece distinct from the latter, and fixed on it by any of the means now in use. In case the wheel is formed by percussion, the other die may be either formed or fixed on the hammer itself.” Both dies are provided with openings or vents for the escape of air or gas during the stamping process, and the latter may be carried on by any known means of percussion, or by passing the dies between rollers. A modification of the last-mentioned system is described, in which the heated bloom is operated upon between rollers, which are of somewhat conical figure, and are so mounted that one of them can be placed at different distances from the other by means of screws, these rollers forming the interior parts of the wheel, while the external circumference is brought into form by the use of a third roller, of a suitable figure, the operation being completed by hammering the wheel between two dies.

The patentees state that wheels thus manufactured, when worn by long use, may have their circumferences turned, and fresh tyres applied by ordinary means; “ or else the wheels may be forged anew entirely, or on the tyre only.”

[Printed, 1s. 2d. Drawing.]

A.D. 1854, May 6.—N<sup>o</sup> 1016.

LA MOTHE, BERNARD JOACHIM.—“ Improvements in the construction of railroad cars.”

According to this invention, a railway car or carriage is composed in the first instance of a frame of wood, consisting of three longitudinal beams united by cross beams and bolts, this frame being mounted upon two other lower frames, which are sustained in a suitable manner by the wheels of the carriage. Upon the upper frame the main body of the carriage is constructed, such body being composed in the first place of a light framework of steel bands, each band being composed of one, two, or more strips of metal, and the different strips intersecting each other and being united at the points of intersection by rivets or screws. Some of these bands rise from one side of the upper frame, are then bent over to form a part of the top of the carriage, and then again

bent downwards to the other side of the frame, other bands running longitudinally one above another, and intersecting these, and being also bent at the parts which are to form the corners of the carriage, and passed across the ends. The central longitudinal beam is covered or bound with iron, and a strong buffer or spring of india-rubber, or some other suitable substance, is placed so as to project from each end of this beam, there being in front of each buffer or spring a strong curved metallic spring, the ends of which are secured to the side beams of the longitudinal frame, and there being also in front of this, again, strong spiral springs suitably secured; these arrangements being meant to prevent damage to the carriage in case of collision. In cases in which it is not supposed that carriages will be subjected to collision, however, these springs may be dispensed with. The steel framework should be lined with some elastic substance, "to act as non-conductor," and to preserve the passengers in case a collision should occur. "The other parts of the carriage may be finished in any manner preferred."

Instead of bands of steel, bands of some other "equivalent material" may be used, and their arrangement varied according to circumstances; the bands passing in some cases under the floor of the carriage, as well as forming the framework of the sides, top, and ends. Such bands may intersect each other either at right angles or diagonally, and buffing springs may be placed at the top of the carriage, in addition to those described.

[Printed, 18d. Drawing.]

A.D. 1854, May 6.—N<sup>o</sup> 1021.

CAMMELL, CHARLES.—"Improvements in buffer, draw, and bearing springs for railway carriages, and in the mode of or apparatus for making the same."

This invention relates, firstly, "to an improved form of spring to be used for the above purposes, and consists in making the spring in the form of a double cone, the two apices of the cone being at each end of the spring; by this means a more elastic spring than usual is obtained," such spring being "made from one strip or bar of metal," which the patentee mentions as an essential part of the invention.

Another part of the invention relates to placing buffer springs "inside a cylinder or box, which is also enclosed in an outer

" case," the patentee stating that by " thus enclosing the spring  
" in an outer case, the risk or liability of the spring case being  
" burst or damaged by accident or undue pressure is much  
" diminished."

Another part of the invention relates to apparatus suitable for forming springs such as described above, and which consists essentially of two mandrils, which are made to rotate in opposite directions after the ends of the piece of metal which is to compose the spring have been inserted in slots therein, such metal being thus formed into two equal concentric coils, which are then drawn into the form of a double cone by moving one mandril away from the other.

[Printed, 10d. Drawing.]

A.D. 1854, May 6.—N<sup>o</sup> 1022.

JOHNSON, JOHN HENRY. — (*A communication from Antoine François Julien Doebs.*)—" Improvements in the construction of  
" railway carriages."

This invention relates, firstly, to a peculiar construction and arrangement of break for railway carriages, and in the next place to a mode of arranging the seats of railway carriages, " which  
" seats are made to slide, and thereby prevent the shock which  
" would arise through a sudden stoppage of the train by the  
" application of the brake. The brakes themselves are composed  
" of a series of sliding shoes or sledges attached to the framework  
" of the carriages," and they are brought into action, and made to bear upon the rails, by lowering the body of the carriage, which is effected by the use of suitable gearing. The latter may either be actuated by the guard of the train, or it may be so arranged that it will be acted upon should the train " run into  
" any obstacle on the line, in which case it would greatly diminish  
" the shock on such an occasion. For this purpose, a telescopic  
" apparatus is placed in front of the train, and the compression  
" or closing of this apparatus, on coming in contact with any  
" obstacle, will bring all the sledges into action, and cause the  
" train to bear entirely upon them and slide along the rails,  
" thereby effectually bringing it to a stand still within a shorter  
" distance than has hitherto been accomplished."

The details of the invention are minutely set forth, and include the use of certain boxes, one of which is placed within the other,

the two being combined with a screw spindle, and being employed to raise or lower the body of the carriage, as may be desired. Also the construction and arrangement of certain moveable or sliding carriage floors, and other particulars, which will only be understood with the aid of the drawing annexed to the Specification.

[Printed, 10d. Drawing.]

A.D. 1854, May 11.—N° 1053.

NEWTON, ALFRED VINCENT.—(*A communication.*)—"An improvement in the construction of carriage wheels, and in the mode of mounting them on their axles."

This invention consists "in connecting carriage wheels in pairs by one solid axle, upon which they can turn independently when this is combined with a non-rotating tubular axle surrounding it, which sustains the load, and which for that purpose extends into recesses in the wheels which turn thereon."

An application of the invention to the wheels and axles of a railway carriage is described, in which the wheels are each formed with a large recess in the centre of its inner face, into which one end of a hollow axle is inserted, such end being of "enlarged diameter," and the recess in the wheel being of such dimensions as to admit not only the enlarged portion of the hollow axle, but likewise anti-friction rollers which surround it, the rollers being kept in due position by means of rings. Through the hollow axle a solid axle is passed, nuts at each end of the latter keeping the wheels in their places. The carriage body is sustained by the hollow axle, from which it is transferred to the wheels by the rollers, and as there is a slight play between the rollers and this axle "the axis of this load axle will always be slightly below the axis of the wheel." The solid axle will usually rotate with the wheels except when the latter are passing round a curve.

[Printed, 6d. Drawing.]

A.D. 1854, May 12.—N° 1056.

PENTON, JOSIAH, and MACKAY, JAMES.—"Certain improvements in the construction of railway wheels and tyres."

This invention consists "in forming a wrought-iron wheel, or a wheel with wrought-iron spokes and cast-iron boss, in two



" parts, each having an angular projection on its periphery.  
 " Upon the inside of the tyre is formed a projecting rib or  
 " feather, of an angular form, which exactly fits into the groove  
 " produced by the two angular projections of the two sides of  
 " the wheel. The two sides of the wheel being brought together,  
 " with the tyre in its place, are fastened by bolts, which secures  
 " the tyre to the wheel, so as to prevent any part of it from flying  
 " off in case of fracture, and at the same time presents great  
 " facility for repairing or reconstructing the wheel."

Several modifications of the invention are described, the invention being set forth in detail as applied in the construction of solid wrought-iron double-spoke wheels, and also single-spoke wheels.

[Printed, 6d. Drawing.]

A.D. 1854, May 12.—N<sup>o</sup> 1068. (\* \*)

WESTLEY, WILLIAM KING.—(*Provisional protection only.*)—

" An improved construction of railway, and carriages to be employed thereon, applicable chiefly to farm purposes." The inventor says :—" The chief object of this invention is to produce a cheap temporary railway, over which light carriages, suitable for carrying farm and other produce, might be run. The railway I propose to support upon a row of pillars, on opposite sides of which the carriages are intended to run. These pillars project through and serve to carry a line of wood planking, to the sides of which iron rails are affixed. Upon these rails, which form a double way, run the wheels of the carriages; and for a further support to the carriages, and to keep them perpendicular, the pillars carry, at their upper ends, a similar arrangement of rails, against the inner face of which antifriction rollers, mounted on the top of the carriages bear." "The supporting pillars may sometimes be mounted on moveable wheel carriages, or on floating boats or pontoons.

"The carriages admit of great variety of form, and may be furnished with four wheels to run on the ground as well as the railway; and the wheels may be supplied with swivels to enable them to move in curves. Their main weight may be borne by either rail on one or more wheels. They may be moved on the railway by simple traction, with a rope pulled by man or beast, or by an endless rope or chain, supported on pulleys, and worked

" at one end of the line by any convenient power, wind, water,  
" animal, or steam."

[Printed, &c. No Drawings.]

A.D. 1854, May 15.—N° 1081.

BROOMAN, RICHARD ARCHIBALD.—(*A communication.*)—

" Improvements in the manufacture of wheels for railway  
" carriages."

One main feature of this invention consists "in making or  
" forming the body of the wheel, that is, the central portions  
" between the rim and nave, out of a sheet or plate, by means  
" of corrugations worked in the said plate from one side or edge,  
" and in such manner as to effect the curving of the other side  
" or edge into the form of a circle, so that the plate will have  
" assumed the shape of a disc. The corrugations are radial and  
" of unequal depth, the greatest depth being near the centre,  
" while at the circumference it is small, diminishing as the corru-  
" gations recede to nothing or nearly nothing at the rim. Hence  
" every concentric section of the wheel will contain the same  
" quantity of material that corresponding sections of the plate  
" had before being formed." Different modes of carrying out  
this part of the invention may be adopted, but one mode is  
described in which a sheet or plate of metal is first bent into the  
form of a cylinder, and then hammered upon a suitable "former"  
so as to produce corrugations therein, these being made so much  
deeper at one end of the cylinder than the other that it is ultimately  
brought into the form of a disc such as described. Plates of  
different forms may, however, be used, or "several plates worked  
" into corrugated sectors."

Another part of the invention relates to combining a wrought-  
iron tyre with the centre piece, which may be done in two ways.  
According to one mode "it is formed out of the solid, and rolled  
" at the same time with the sheet from which the centre is to be  
" made. Another plan is to roll the tyre separately, with a  
" dovetail groove formed on its inner edge. For this latter plan  
" one edge of the plate is also to be rolled with the dovetail to  
" match," and "the tyre is then to be slipped on the edge." In  
this arrangement the corrugations of the plate may be pro-  
duced by "crimping" without first forming the plate into a  
cylinder.

[Printed, &c. Drawing.]

A.D. 1854, May 15.—N° 1083.

PRINCE, PAUL.—(*Provisional protection only.*)—"Retarding railway trains on the approach of danger, and for other purposes."

This invention relates to the application of breaks to the wheels of all the carriages composing a train by one movement. "Each pair of breaks is connected by a bar of wood or iron, and is placed to each pair of wheels. At the sides nearest the middle of the carriages a wedge is made to fall in between the connecting bars of each pair of breaks, with a sufficient amount of momentum to retard the velocity of the wheels. Motion is given to the wedge by a heart wheel or eccentric, fixed on a shaft extending the entire length of the carriages.

"Power for applying the breaks is transmitted from either end of the train, and from one carriage to another, by affixing at the ends of the longitudinal shafts radial arms or wings, so that when motion is given to one shaft the radial arm on the end of the shaft acts on the radial arm of the shaft of the next carriage, and the process is continued until all the breaks are applied throughout the train. The wedge is liberated after application of the break by a fixed lever acting between the connecting bars, and is then put back to its place."

[Printed, 4d. No Drawings.]

A.D. 1854, May 22.—N° 1131. (\* \*)

BLAKE, JOHN.—(*Provisional protection only.*)—"An improved shackle hook."

The inventor says,—"My improved shackle hook is constructed so as to support the point of the hook, and thus to prevent the hook from unbending when exposed to a great strain or weight. This I effect by means of a loop link or tie-rod, which forms part of the shackle, and is so placed that when the hook is in the position which it assumes when the strain is upon it, the point of the hook enters the loop or link, and is thus supported. When the strain is removed, the point of the hook may be readily withdrawn from the loop or link, so as to allow of its being hooked and unhooked. My improved shackle hook is thus self-acting, as the strain upon it causes it to assume the proper position."

"The shackle may be variously formed, according to the pur-

“ pose for which it is required. Thus it may be formed as a loop  
 “ or link of a chain when it is required to be attached to a chain  
 “ for a crane or other purpose; or the shackle may form the end  
 “ of the draw bar of a railway carriage when the hook is employed  
 “ for the purpose of attaching the draw links or chains. Various  
 “ other forms may be given to the shackle, but in all cases the  
 “ aforesaid loop link or tie-rod is fixed to or forms part of it,  
 “ and is placed in such a position that the point of the hook is  
 “ supported by it when the strain is on the hook.”

[Printed, 4d. No Drawings.]

A.D. 1854, May 24.—N° 1159. (\* \*)

CLARENDON, THOMAS, and GILSEN, OWEN JOHN.—“Im-  
 “ provements in the means or apparatus for working breaks on  
 “ railway carriages.”

This invention consists of apparatus applied to the inner ends of the buffer rods, so that when the buffer rods are driven inwards by the speed of the engine being less than that of the carriages following, the breaks are applied to the wheels, and at the same time a signal bell in the guard's box rings; and when the pressure on the buffers ceases, the breaks are withdrawn, and the signal bell again rings. The apparatus consists of levers connected with the inner ends of the buffer rods on each side of the carriage, and having for their fulcrum a bar extending across the carriage. The levers are connected with two strong plate springs, to which are fixed the ordinary brake blocks. In the centre of the carriage, and connected at its two ends to the buffer rods, is a strong plate spring to restore the buffer rods to their original position, and withdraw the breaks whenever the pressure on the buffer ceases. The levers act on a bell crank fitted beneath the carriage, and connected with a bell in the guard box by a wire, and so causes the bell to ring when the breaks are put on or withdrawn.

*Claims.*—1. “The general construction and combination of the  
 “ mechanism described, with the ordinary apparatus for working  
 “ the breaks.”

2. “The adaptation and application of the plate springs or  
 “ other suitable elastic coupling between the break blocks and  
 “ the levers by which they are thrust against the wheels without  
 “ injurious effects, as described.”

3. "The arrangement for causing a bell to ring in the guard's box whenever the breaks are put on or withdrawn."

[Printed, 10d. Drawing.]

A.D. 1854, June 3.—N° 1238.

**FORETIER, JOHN SAMUEL.**—(*A communication.*)—(*Provisional protection only.*)—"Improvements in railway breaks and in machinery connected therewith."

According to this invention every break in a train "can be locked or unlocked simultaneously." Each carriage is provided with two longitudinal rods, mounted in suitable bearings, and so combined either through the medium of a connecting bar or beam, or racks and a pinion, that by turning a shaft provided with a handle, and which brings into operation certain other gearing, the rods are moved longitudinally, but in opposite directions, and, by means of suitable apparatus connected with them, are made to press the breaks against the wheels when moved in one direction and release them therefrom when moved in the other. The rods of one carriage are connected to those of another by chains, and thus by turning the handle above mentioned and applying the breaks of one carriage the breaks of all the other carriages will be applied also. Instead of thus working the breaks by hand, however, they may be worked by means of rods carried by the tender and connected to those of the first carriage of the train, such rods being moved when necessary by a double fan or wheel, which is enclosed in a cylinder and actuated by steam from the engine, suitable gearing connecting the fan or wheel with the rods, or the latter being operated upon by gearing worked from one of the axles of the tender. The gearing on the latter, as well as that on each of the carriages, may be placed at pleasure either in or out of contact, and in the latter case the breaks may be worked by hand in the ordinary manner.

[Printed, 4d. No Drawings.]

A.D. 1854, June 8.—N° 1267.

**SKERTCHLY, JOSEPH, junior.**—(*Provisional protection only.*)—"Improvements in the manufacture of gates, hurdles, and fencing, in vehicles, waggons, carts, and trucks for common roads and railways, and in facias, entablatures, window head-

"ings, parapet, and other mouldings projecting from the brickwork of buildings."

This invention consists "in facing or covering the surfaces of properly formed mouldings of wood with sheet iron or other metal by the process of drawing or mechanical pressure." The separate parts necessary to constitute the article to be made are first formed of wood, and the sheet metal then applied thereto by means of dies, the two being thus combined together, and the several requisite parts being thus formed, "are put together in the ordinary manner; but in forming the mortice and tennon joints in connection therewith the mortice is cut something less than the tennon which is to enter therein," the tennon being then subjected to pressure in suitable dies so as to enable it to enter the mortice, its tendency to expand after insertion causing it to "form a more secure joint than by the ordinary means." No special application of the invention is set forth.

[Printed, *4d.* No Drawings.]

A.D. 1854, June 13.—No 1292.

COMPTON, CHARLES HENRY.—(*Provisional protection only.*)  
—"An improved railway break."

This invention consists of "a self-acting or self-adjusting break for railway carriages." The break blocks, rods, and cranks are similar to those at present in use. On the shaft of the break block cranks is a lever, the end of which is connected by a rod to a socket rod, "both forming a continuation of the buffer rod. In the connecting rod there is a groove, which receives a strong spring bolt in the carriage frame. In the spring bolt there is also a groove, and immediately behind the groove, in the connecting rod, a collar is fixed. In this collar there is a spring catch, which slips into the groove in the spring bolt when the same is drawn back, and holds it from entering the groove in the connecting rod, and allows the same to be acted upon by the buffer rod. The strong spring bolt is drawn back by a lever and rod attached to the tug or drawing rod of the carriage. The main rod of the buffer is continued from its shoulder, which presses against the spring (spiral or indian rubber) through the spring and the end works into a socket in the socket rod. This socket rod is formed with a shoulder, which presses against the spring, and divides it into two parts.



" The shaft of the socket rod passes through a portion of the spring, and works in a socket in the cross frame of the carriage.  
" When pressure is applied to the buffers the motion of the buffer rods applies the break in stopping the train, and the motion of the tug or drawing rod releases the break in starting the train," the arrangements being, however, such that the breaks are not applied in backing the train after the latter has been brought to a state of rest, " the connecting rod being then locked by the spring bolt."

[Printed, 4d. No Drawings.]

A.D. 1854, June 21.—N° 1363.

STABLEFORD, WILLIAM.—" Improvements in railway breaks."

This invention consists " in applying breaks to all or any of the wheels of a railway carriage and on the upper parts of the wheels ; such breaks being brought into action by means of wedges or levers actuated in the ordinary manner now adopted for working the break, or by means of toothed wheels, pinions, racks, worms, or screws, and in such manner as to bring the weight of the carriage in a great measure upon the breaks, and through them upon the wheel, nave or naves of the wheels ;" two breaks, where desirable, being applied to each wheel, " one in front and the other at the back thereof." The break blocks are mounted " in boxes cast in a piece with the bottom of plates which are free to slide in boxes bolted to the framing of the carriage. The lower ends of the break blocks, when not in action upon the wheel, are just clear thereof, but come first upon the wheel when the breaks are applied," and as the operation is continued " the plates carrying the break blocks are caused to slide, and thereby to bring the whole surface of the blocks upon the wheels, the back parts of the sliding plates being capable of a tilting action." Between the sliding plates and certain parts of the boxes containing them are placed india-rubber or other springs, which keep the breaks out of contact with the wheels when not required to act.

Various modifications of the invention are described, the apparatus for bringing the breaks into action being in all cases connected by a rod to a disc or plate capable of being turned through the medium of a worm and worm wheel and other gearing provided with a hand wheel. In most cases two break blocks are

applied to each wheel, such blocks, however, being in each arrangement placed so as to act upon the upper portions of the wheel, and the boxes carrying the break blocks, with their plates, are mounted in bearings so inclined and contrived that on the blocks being forced against the wheels they tend to lift the body of the carriage, thus bringing the weight of the latter partially upon the breaks. One arrangement, however, is described which does not altogether correspond with the others, there being in this case one break block placed directly over the wheel, and connected to a box which slides up and down vertically, the break being applied by means of a wedge which is drawn between a roller mounted on the carriage frame and another roller carried by the top of the break box. The details of the invention will only be fully understood, however, with the aid of the drawings annexed to the Specification.

[Printed, 1s. 6d. Drawings.]

A.D. 1854, July 3.—N° 1456.

CHAUVEAU, URBAIN, and D'EPINOIS, CHARLES.—“Improved means or apparatus for preventing collisions on railways.”

The object of this invention is “by means of certain small apparatus or machines, placed at convenient distances along the line of railway, to strike against a lever, catch, or other contrivance attached either to the engine or the break carriage of an advancing train, so as to bring into action certain levers or mechanical contrivances in connection with the steam ports or valves of the engine, in order to cut off the steam from the cylinder, or by operating on the break apparatus to bring the breaks against the wheels of the carriages, in order to retard the progress of the train.” The apparatus to be placed on the line of rails “consists principally of a lever or arm and pulley, mounted on a short shaft, at one end of which is a crank or arm which is acted upon by the under part of the engine or carriage and thus causes the short shaft to turn in its bearings and bring the lever or arm up, so that it may be in a position to act on the engine or carriage of another train. There are pairs of these little apparatus arranged together at the same spot, and the pulleys of one apparatus are connected with the pulleys of the next succeeding and preceding but

"distant apparatus (say, five hundred yards away,) by means of  
 "a cord or chain, so that when the engine or carriage acts upon  
 "the crank or arm of one apparatus, it may, by means of the  
 "chains or cords from the pulley, act on the pulleys of the appa-  
 "ratus five hundred yards off, and in advance, and thereby raise  
 "the lever or arm of that apparatus, so that such lever or arm  
 "may catch or strike against the engine or carriage of any other  
 "approaching train, and thus cut off the steam and act on the  
 "breaks of such train, and thereby stop the train without the  
 "intervention of the attendants."

The locomotive engine may be caused to act upon the apparatus placed upon the line by means of an inclined plane, or inclined planes, with which it is furnished, and the arrangements are such that not only is a train, when desirable, caused to act upon the mechanism so as to stop a following train, but also to stop a train or trains which might by accident be advancing upon the same rails to meet it.

[Printed, 10d. Drawing.]

A.D. 1854, July 6.—N<sup>o</sup> 1489.

MCCONNELL, JAMES EDWARD. — "Improvements in wheels, axle boxes, and brakes for railway carriages."

This invention relates, firstly, to the manufacture of railway wheels "in one single mass or piece from a wrought iron plate or slab (either solid or previously piled, built, or welded together to the rough size and form of a railway wheel), by the aid of pressure in moulds, the requisite pressure or moulding action being obtained in any convenient and suitable manner." Various modes of carrying out this part of the invention are described, in some cases the wheel being composed of two plates or discs, so bent at the inner and outer circumferences that when placed and rivetted together the bent parts compose the boss and rim of the wheel, a suitable tyre being afterwards placed on the latter. In another case one entire disc only is used, this forming the body of the wheel, while the boss and rim are composed of rings riveted to the disc, one ring of angle iron forming the rim, and the boss being either composed of one ring on each side of the disc, or of one ring forming one side of such boss while the other side is formed of a portion of the disc which is bent outwards. In other cases the whole wheel, with the exception of the tyre, is

formed out of one solid slab, suitable dies and matrices being in each case used to bring the metal into the requisite form. Different modes of piling, building or welding pieces of metal together to form the plates or slabs of which wheels are to be made are set forth, in one case a slab being composed of a number of segments piled together in such a manner as to break the joints between an upper and a lower series of such segments.

Another part of the invention relates to modifications of the axle box for which a patent was granted to Henry Vigurs on the 4th of November, 1851, and consists in constructing the washer or disc plate, which fits upon the shoulder of the axle and retains the grease in the box, either of pulpy matter such as that used for the manufacture of paper and millboard, or some other plastic material or composition, brought to the requisite form by moulding or otherwise, or of wood or other light substance. "It is intended to form or arrange in this way all those parts of axle boxes where the escape of oil may occur, in addition to the adaptation of the improvements to the special arrangement of the said Henry Vigurs."

That part of the invention relating to brakes consists in "forming the brake blocks with metallic or cast or wrought iron shoes, holders, or frames, to hold the wood or other material of which the frictional block is formed. Or the brake blocks may be formed of blocks or layers of wood and metal, or other suitable materials, disposed alternately."

[Printed, 1s. 4d. Drawings.]

A.D. 1854, July 11.—N° 1513.

AERTS, PAUL FRANÇOIS. — "Improvements in constructing parts of railway rolling stock, and in the lubrication thereof."

The first part of this invention has for its object to facilitate the passage of railway vehicles round curves, the arrangement adopted being such that carriages of considerable length may be used with safety, provision being made for keeping the ends thereof always in a direct line with the centre of the railway, and thus relieving them from any strain on passing round such curves. To attain this object the patentee uses "three framings for such vehicles, namely, a moveable frame, an intermediate frame, and an upper frame. The first is arranged in three divisions or parts, which are allowed to move or play as the rails of the railway depart from

" a straight line, or form a curve or curves on the line. The  
 " intermediate frame serves to join the moveable frame to the  
 " carriage (or upper) frame, and upon that frame the buffer and  
 " traction apparatus and their appurtenances are fixed," such  
 apparatus being of the usual character.

The improvement in lubricating the journals of railway rolling stock consists in fixing a small wheel on each extremity of the journals of such rolling stock, which, by its rapid rotation when the journal to which it is attached is in motion, " forces the oil or  
 " other liquid or semi-liquid lubricating material towards the  
 " upper part of the axle box, from which it flows or is pressed on  
 " to the bearers and journals, and the greater the rapidity of  
 " motion attained by the train the more effectual will be the  
 " lubrication of the bearers and journals."

[Printed, 8d. Drawing.]

A.D. 1854, July 12.—N° 1520. (\* \*)

EASSIE, WILLIAM.—"Improvements in trucks used on rail-  
 " ways." These consist in " the prevention of the shock occa-  
 " sioned by sudden starting or stoppage of railway and other  
 " trucks, which may be connected by a draw pole or bar, for the  
 " purpose of carrying timber and similar goods, and thereby  
 " preventing to a much greater extent than at present the wear  
 " and tear of the same," by employing tubes " or casings of india-  
 " rubber placed vertically or otherwise at the points of fastening  
 " the draw bar with the framing of the trucks."

[Printed, 8d. Drawing.]

A.D. 1854, July 13.—N° 1542.

BODMER, RUDOLPH.—(*A communication.*)—"The application  
 " of glass, crystal, or other vitreous material, or of earthenware  
 " (céramique) to certain parts of machinery."

This invention consists "in the application of glass, crystal,  
 " and other vitreous material, or of earthenware (céramique)," as  
 " the most suitable substitute for metal or other materials in the  
 " manufacture of steps, sockets, or bearings " for machinery, such  
 steps, sockets, or bearings being cast or formed in suitable  
 moulds, and being used either in their rough state, or being cut  
 or ground and polished, and, if desirable, annealed previous to  
 being used. "They may be fixed in the usual manner, and in

" order to prevent vibration they may be packed with or placed upon cloth, caoutchouc, or other slightly yielding or elastic material."

The invention is mentioned as being especially applicable to " the rolling stock and fixed machinery of railways;" also to stationary and marine steam engines, shafting, and gearing.

[Printed, 4d. No Drawings.]

A.D. 1854, July 14.—N° 1545.

STOCKER, ALEXANDER SOUTHWOOD.—" Improvements in " axles."

This invention consists "in the application of manufactured tubes to the making of railway and other axles, such tubes being used either alone or in combination with a solid core of any suitable section, the external parts being shrunk upon the core or ends, or otherwise secured."

Different modifications of the invention are described, in some cases one tube being shrunk upon, or formed or drawn over another, in other cases a tube or tubes being combined with a tri-lateral, cruciform, or other core of similar section; the patentee including as part of his invention the making of axles with a series of tubes, whether the tubes be made in the ordinary mode of forming tubes or otherwise, as also whether they are first manufactured and shrunk on or otherwise applied, or are formed on or upon the core or journals, and likewise the galvanizing of tubular axles, "by which perfect solidity is given to the parts thereof "and by which they are protected from oxydation."

The patentee states that axles may be thus formed without the frequent reheating and welding of the materials necessary under the ordinary system of preparing axles, axles thus constructed not being liable, moreover, "to become fractured at the shoulder " of the journal or bearing."

[Printed, 10d. Drawing.]

A.D. 1854, July 14.—N° 1553.

DECHANET, JEAN BAPTISTE, and SISCO, ANTOINE DOMINIQUE.—" Certain improvements in the construction of railway " carriages."

This invention relates to the wheels and frames of railway waggons and carriages. That portion of the invention which



relates to wheels is described under a great variety of modifications. In one case two parallel discs are united to a tyre by bolts passing both through the discs and through an internal flange or rib in the tyre, the boss of the wheel being composed of rings, and bolts passing through these, through the discs, and through a large collar projecting from the axle, the latter being short, and having a journal on each side the wheel, but such wheels being in other cases fixed upon ordinary axles. The tyres of such wheels may be formed with the internal rib or flange attached thereto, or such internal rib may consist of a ring formed separately therefrom, and one arrangement is described in which a tyre of the ordinary character is placed upon an internal rim of the same breadth, the latter having an internal rib to which the discs are bolted.

In order to apply wheels with the short axles mentioned above to a truck or carriage, such axles are provided with an axle box, a guard plate, and bearing spring on each side of each wheel, the guard plates being kept at the proper distance asunder by suitable plates, and, in addition to being bolted to the sides of the frame, being sustained by diagonal tie rods extending from them to the lower parts of the frame. Such frame is, according to one part of the invention, composed of wrought or rolled iron having double flanges on each edge, while according to another part of the invention the framing is composed of iron tubes, the parts which are attached thereto being provided with large rings or bosses which fit thereon, and are connected thereto by rivets or screws, the buffer rods working in the longitudinal tubes forming the sides of the frame in which the buffer springs are placed.

[Printed, 1s. Drawings.]

A.D. 1854, July 17.—No. 1568.

WARCUP, WILLIAM.—“Improvements in the construction of “ springs for carriages and similar purposes.”

This invention relates to certain modifications of and improvements upon the invention for which a patent was granted to the present patentee on the 26th of May, 1853, and consists in connecting the V or U, or open angular double blade springs mentioned in the Specification of that patent, “to a plate secured to the under “ side of the carriage, waggon, or engine framing, in place of

"fitting such springs into the interior of a spring box," as described in that Specification. "In the present arrangement a series of V or U springs are placed side by side, so as to form one compound or angular double blade spring; or, if found desirable, one or two V or U springs may be used in place of a series of such springs. Two of these compound springs will be employed if applied to an axle box, one spring being situated at each side of such box. The extremities of the two lower series of blades bear upon the top of the grease box, whilst the extremities of the upper blades will bear against a plate attached to the under side of the carriage framing. The springs are attached to the framing by means of a pin or small roller, on to which are threaded (at their apices) the several small springs which constitute the compound spring" mentioned above.

The patentee states that springs thus arranged and disposed are applicable as the buffer, bearing, and draw springs of railway engines and vehicles, and gives various illustrations of their adaptation to those purposes, mentioning also that such springs may be applied to other vehicles and to "gun carriages and ordnance work generally."

[Printed, 10d. Drawing.]

A.D. 1854, July 18.—N° 1581.

DALGETY, ALEXANDER.—(*Provisional protection only.*)—"Improvements in the reduction of friction."

This invention consists "of a peculiar arrangement of anti-friction rollers," which, as applied to sliding surfaces, are fitted with a small toothed pinion which gears into corresponding racks on the sliding part or parts, by which means the rollers are always kept in their proper positions, as the interlocking or gearing of the pinion teeth with the teeth of the racks will effectually prevent the displacement of the rollers, which would otherwise occur if the sliding parts were working vertically."

This arrangement "is obviously applicable to rotatory engines with sliding diaphragms or pistons, to the tables of planing machines, slotting and shaping machines, and a variety of other purposes, which will readily suggest themselves to the practical man, as applied to revolving surfaces or bearings of

" all kinds, whether such bearings be the journals of shafting or machinery in general, or axles of railway and other carriages."

In applying the invention to " railway carriage axle boxes it is proposed to employ three or more antifriction rollers working against the circumference of the axle journal;" such rollers being sustained by rings which are connected together by studs, the rollers being so arranged that although they all bear upon or against the axle they are kept out of contact with each other. Or instead of rings, links or chains, or pinions gearing with circular racks, may be used.

The invention may not only be applied to railway purposes, but also to plumper blocks and bearings of all kinds, and the hinges of large doors or gates.

[Printed, 4d. No Drawings.]

A.D. 1854, July 21.—N° 1601.

JEAN, ARMAND BENOIT JOSEPH, and HUGUES, ALFRED ALEXANDRE.—(*Provisional protection only.*)—" Certain improvements in reducing the friction of axles, bearings, or other rotatory rubbing surfaces in machinery."

According to this invention an axle box is constructed, the internal diameter of which is larger than that of the axle, a number of small rollers being placed in the annular space between the axle and axle box. " These rollers are connected together by a ring or annular frame at each end, which keeps them at equal distances apart," and as the axle revolves in the axle box, or the axle box revolves on the axle, these rollers roll round between them, " and thus produce a rolling in lieu of a rubbing motion. They are confined endways by a groove or grooves in the axle or axle box. In lieu of these rollers rolling upon the axle itself they may roll upon a cylindrical block attached to the axle. The rollers may have conical ends, and may be turned of different diameters at the parts which come in contact with the axle or its block, and at the parts which come in contact with the axle box. In lieu of making the axle and box cylindrical, they may be double cones, with two sets of rollers between them, confined by rings or annular frames, as before. Other bearings and rotatory rubbing surfaces in machinery are constructed in a similar manner."

[Printed, 4d. No Drawings.]

A.D. 1854, July 21.—N° 1602.

NEWTON, ALFRED VINCENT.—(*A communication.*)—"An improved construction of metallic spring."

This invention relates to the employment of "a thin metallic strap and rigid bar, connected together at each end" in place of the ordinary bearing spring for carriages. "The elastic force rendered available in this construction of spring is derived from the tendency of the thin metallic strap to retain its length and form, in opposition to the tensile strain put upon it by the load which it carries."

The invention is described as applied to railway vehicles. A strong rigid bar is first passed from the top of one axle box to the top of the other, and the metallic strap, which is of bent or undulating form, is then attached to the rigid bar at each end, the strap being below the bar, and the frame of the carriage resting upon a bracket furnished with a pin which bears upon the metallic strap. "Instead of a single thin strap a series of two or more straps may be used."

[Printed, 6d. Drawing.]

A.D. 1854, July 29.—N° 1671. (\* \*)

HARRIS, PETER GEORGE.—(*A communication.*)—This arrangement is to transfer the greatest weight to the driving wheels, and to ease the locomotive round the sharpest curve of the railway. The fore part of the locomotive supports the boiler and engine, and the hind part the tender, and a portion of the weight of the boiler; the two parts are coupled by a strong axis between the hind axle of the fore part, and fore axle of the hind part; the fore part has an inside, the hind part an outside frame, and the fire-box is so placed as to allow the boiler to revolve in accordance with the quickest curve of the railway. If increased adhesion be required, the axles may be coupled by toothed wheels.

[Printed, 10d. Drawings.]

A.D. 1854, July 29.—N° 1675.

COLLASSON, GUSTAVE EMILE BERNARD.—(*A communication.*)—(*Provisional protection only.*)—"Certain improvements in the means for arresting or checking the progress of trains on railways."

The inventor here arranges the brakes of railway carriages "in such manner that they are capable of being put in operation either by steam or by hand, at pleasure." A steam cylinder is fixed to each carriage, and the cylinder of one carriage is connected with that of another by means of pipes furnished with flexible joints and stuffing boxes, these pipes forming, in fact, a continuous passage from one end of the train to the other. Each cylinder is provided with a piston and piston rod, the latter passing through both ends of the cylinder, one end of the rod being connected with a lever or levers for putting on the brakes, and the other with a lever capable of being worked by hand, by means of a screw or otherwise, a spring being provided "for drawing away the brakes from the wheels." The result of these arrangements is that the brakes may be applied either by hand or by introducing steam into the cylinders through the medium of the pipes mentioned above, which are apparently meant to have some communication with the boiler of the engine, three-way cocks being placed near the cylinders, and these being capable of arrangement so as at any time to admit steam to the cylinders, or merely to allow the passage of a small quantity of steam through the pipes "to keep them hot."

[Printed, 4d. No Drawings.]

A.D. 1854, July 31.—N° 1683.

DEMAI, JEAN CHRILOTTOME DENIS.—(*A communication from Antoine Charles Cardot.*)—"Preventing the accidents on the railways with the aid of a right line of iron, and in stopping the trains almost instantaneously."

This invention is described in language so extraordinary that it is next to impossible to understand what the patentee means. After making a number of observations upon the stopping of trains when running at a high speed he comes to the conclusion that if "by a whatsoever mean we can stop simultaneously the rotation of all the wheels of a train" it shall not travel, according to the arguments adduced, "more than fifteen feet." He then proceeds to describe an arrangement of mechanism in which a pinion and handle are apparently meant to operate upon a system of levers, and thereby apply breaks to the wheels of a railway engine or carriage, but the whole Specification is so con-

fused that no proper idea of the invention can be formed from it, levers, rods, screws, chains, and other mechanism being used in profusion, and it being apparently meant that the breaks shall come into action in the case of a train diverging from a horizontal line, in consequence (for example) of a sinking of the rails, independently of the action of the attendants, the patentee stating that "it is then well acknowledged" that the basis of his system "is specially grounded, and although may be the mechanical mean" on the rupture of the parallelism existing between the way and "the material" the invention will come into action.

[Printed, 1s. Drawings.]

A.D. 1854, August 5.—N° 1722.

JOHNSON, JOHN HENRY.—(*A communication from Hippolite Ulysse Petin and Jean Marie Gaudet.*)—(*Provisional protection only.*)—"Improvements in the manufacture of railway and other wheels."

This invention relates to the manufacture of wheels for railway and other purposes of malleable iron, "the wheels being" operated upon in a heated state by means of compressing and "combined rolling and drawing apparatus." A helical coil of malleable iron, of a flat section, is first taken, and this, being heated, is then acted upon by a steam hammer, of which the face is formed into a species of die, the anvil below being formed so as to correspond to the side contour of a wheel blank. The annular hollow in the upper surface of the wheel blank is formed by a ring of steel or wrought iron placed upon such blank, and passed upon a central mandril fitting a socket in the anvil. A rough wheel blank being thus formed, is then finished by a subsequent process, the blank being made of less diameter than the wheel to be produced from it, and being brought to the requisite size and form by means of rolls. The latter may be variously arranged, the upper roll being placed by preference in an inclined position, and mounted in bearings which are raised or lowered by means of screws, the blank being either placed upon a vertical mandril, or upon a stationary support, as may seem most desirable.

[Printed, 4d. No Drawings.]



A.D. 1854, August 8.—N° 1733.

STOY, HUGH. — (*Provisional protection only.*)—"Stopping of engines and carriages on railways, and also vehicles of every description on the common roads."

The inventor commences his Provisional Specification by stating his contrivance to be a new invention for stopping engines and carriages on railways, its object being "also to prevent the slipping of the driving wheels of the engine," the invention being "different from all others worked at the present day," and being capable of preventing "the high driving wheels drawing the engines and carriages of the line."

The Specification is accompanied by a diagram, from which, taken with the description, such as it is, it would seem that the driving wheels of the engine of a train are by some means to be lifted off the rails, and to be then kept in rotary motion in order "to act as flies," there being, however, large curved breaks passing over them, which are apparently meant to stop their motion. These large wheels are connected by cranks and rods with other wheels not half their diameter, an arrangement which would obviously render the proceeding of a train under ordinary circumstances impossible. Breaks to the carriage wheels are apparently meant to be brought into action by the buffers, or by rods acting as such, in case of one carriage tending to over-run another, the inventor stating that "the action will be emendently on the wheels of every carriage on the traine." He also states that the same action "can be applied to the break van by the guard," and that "the break on the carriages of every description on the common roads can be acted on a bar from the hine axel, with an arme to carry the break to the sid of the wheel, by the hand or foot of the driver on the box, to lock his wheels at pleasure, and releave it again in a moment; to be called Stoy's break."

[Printed, &c. Drawing.]

A.D. 1854, August 12.—N° 1760.

GIBSON, JOHN.—"Improvements in the manufacture of railway wheels."

This invention consists "in securing tyres upon the frames or bodies of railway wheels having a dovetail or undercut peri-

“ phery by means of ribs or fillets rolled upon or forming part of  
“ such tyres, by setting or calking one or both of such ribs or  
“ fillets on one or both sides of the dovetail or undercut part of  
“ such frames or bodies at intervals, or with spaces between such  
“ settings or calkings,” the patentee stating that by this arrange-  
ment “ the tyres are more easily removed and replaced, and may  
“ be similarly secured a second or even a third or fourth time by  
“ setting or calking such portions of the ribs or fillets as have  
“ not been previously chipped, cut away, or destroyed.”

Various modes of carrying out the invention are described, and illustrated by a variety of figures in the drawing annexed to the Specification, the patentee stating that he wishes it to be understood that he intends to employ “any combinations of the  
“ methods described ” which in practice he may find to be useful or advantageous.

[Printed, 10d. Drawing.]

A.D. 1854, August 14.—N° 1773.

SMITH, HENRY. — “ Improvements in the manufacture of  
“ wrought-iron wheels.”

The object of this invention is to form the nave and the spokes of wrought-iron wheels “ out of one mass of metal by extrusion  
“ of portions of the metal to form spokes,” such metal being acted upon while in a highly heated state. A mode of carrying out the invention is described, in which a mould is employed, the upper part of which constitutes a cylinder or receiver, into which a mass of highly heated iron is first placed, and then forced downwards by a ram into the lower part of the mould, in which are grooves so formed as to receive portions of the hot metal and give them the shape of spokes. The central part of the bottom of the mould and the lower surface of the ram are so recessed as to form the two sides of the nave, and the mould is composed of two parts, which may be separated when the operation is completed, so as to release the metal therefrom, being held together by bolts while the operation is proceeding. The patentee states that by these means “ the junction of the nave and each spoke will be  
“ soundly formed, and the defects incident to former modes of  
“ making the union of spokes and nave avoided.” If desirable a pin may be placed in the lower part of the mould, for the purpose

of forming "a hole in the centre of the nave to facilitate boring," and the wheel having been thus partially formed may be completed by any ordinary means. The invention is obviously meant for use in the manufacture of railway wheels.

[Printed, 6d. Drawing.]

A.D. 1854, August 23.—N<sup>o</sup> 1852.

**YOUNG, JAMES HADDEN.**—"Improvements in the construction of railways."

The object of this invention is "to reduce the weight of wrought iron used for the constructing of railways," and the invention consists in "so constructing a railway as to take advantage of the tensile property of the iron used, in place of simply depending, as at present, on the property which the rails have to resist bending, for which purpose the rods or wires used are kept in a state of tension, by being stretched over posts, sleepers, or other fixtures, according to the inequalities of the ground, whilst the intermediate posts may be less firmly secured, as they only serve to steady the rods or wires." On these stretched rods or wires the patentee proposes that vehicles shall run, "as on the rails in ordinary use," and he affixes "guide wheels to the vehicle to prevent it going off the rods or wires."

The guide wheels mentioned above are placed diagonally, so as to bear against the upper side or edge of the rail or wire, and so "steady the carriage when in motion."

[Printed, 10d. Drawing.]

A.D. 1854, September 1.—N<sup>o</sup> 1911.

**FONTAINEMOREAU, PETER ARMAND LE COMTE DE.**—(*A communication.*)—"Certain improvements in apparatus for retarding and stopping railway carriages."

In this invention a metallic ring is fixed upon each of the axles of a railway carriage, "and an open circular spring or collar of a larger diameter than the ring is placed over it. The dimensions of the spring or collar are determined according to circumstances. The free ends of the spring or collar are fixed to a lever, which causes them to approach or recede and act upon the axle."

"The free ends of the spring can be acted on by a lever running the whole length of the carriage, and communicating with two levers of unequal length. The smaller lever acts upon a horizontal rod underneath the train, and receives an alternate movement, so as to draw along in its motion the lever acting upon the springs. A weight placed at the free extremity of the main lever causes the lever to lower when the weight is let go," which is effected by releasing a detent from a ratchet wheel, in connection with which is a barrel having a cord connected thereto, which is also connected to the weighted lever, and which cord is coiled upon the barrel by turning a winch when it is desired to raise the lever out of action. The cords of several carriages may be connected to one barrel, and the break apparatus of such carriages thus be operated upon simultaneously.

[Printed, 10d. Drawings.]

A.D. 1854, September 4.—No 1928.

MILLER, GEORGE MACKAY.—"Improvements in axle boxes and parts working in connection with axles of carriages and other vehicles in use upon railways."

The first part of this invention, which relates to axle boxes and the parts in immediate connection therewith, "is designed to increase the security of retaining the grease and supplying it to the journal of the axle as required, as well as to exclude dust, sand, &c. from the axle box." The latter is so constructed that the grease (or other lubricating matter used) "passes through the bearing or step into a chamber surrounding the journal, thereby coming into direct contact with and effectually lubricating every part of the journal; or it may be introduced into the lower chamber without passing through the step," and in order to retain such lubricating matter and prevent the admission of sand, water, or other foreign matter, the cap of the box is hinged at the front either to the axle box itself or to a separate plate, and kept in position by springs or otherwise, while the same effect is produced at the back of the box "by a guard of metal, cast on the step or bearing or otherwise, or by a guard of any description of timber bushed with metal," and furnished with suitable screws or springs, such guard being, if desirable, made in two parts.

Another part of the invention consists in introducing between the axle and the nave or boss of the wheel mounted thereon a

cylinder of suitable metal, which extends for some distance through the wheel, such cylinder being free to revolve (with the wheel) upon the axle, and being kept in its place by a collar on the axle, and a washer which is bolted or otherwise attached to the end of the cylinder; the object of this part of the invention being to prevent torsion of the axle.

[Printed, 10d. Drawing.]

A.D. 1854, September 4.—N<sup>o</sup> 1931.

ROWLAND, ELLIS, and ROWLAND, JAMES.—(*Provisional protection only.*)—"Improvements in coupling or connecting " links for railway carriages or other such purposes."

The inventors mention in the first place that various appliances have been used from time to time for the purpose of connecting railway carriages, that most usually employed being the right and left-handed screws and weighted rod, but that in lieu of these they propose to employ "a cylindrical chamber filled with oil or " other liquid, having a connecting channel on its upper side " running from one end of the chamber to the other, and at one " end being furnished with a valve opening inwards." The ends of the chamber are provided with stuffing boxes, through which pass connecting rods, "at one end of each of which the " carriages are secured, and the rods form shackling joints " through the stuffing boxes," these rods in effect forming a continuous rod through the chamber, furnished at or about the centre with a piston block, the result of the arrangement being that when one carriage is advanced towards in order to be coupled with another, the former, coming in contact with the shackling rod, moves the piston in the oil, driving a portion of the latter from one side of the piston to the other through the connecting channel, the return of the oil, and consequently of the piston, being prevented by the valve, and the carriages being thus locked together. The valve may be operated upon by a pin, so as to " equalize the oil on each side of the piston," the apparatus thus forming "a self-acting hydraulic connecting link."

[Printed, 4/1. No Drawings.]

A.D. 1854, September 11.—N<sup>o</sup> 1975.

JACKSON, PETER ROTHWELL.—"Improvements in the manufacture of wheels."

This invention relates to the manufacture of wheels of wrought iron, and is "carried into effect by means of a block or die, " formed in a face or bed plate, furnished with radiating grooves " or channels, opening outwards from the mould in suitable " positions, form, and strength to correspond with the spokes of " the wheel to be made, and with other suitable mechanical " arrangements and power, so that the heated iron, after having " been placed in such mould or die, may not only be formed to " the shape of such mould, but also forced through the grooves " or channels radiating therefrom to form spokes or parts thereof, " and bent, if so desired, at their outer ends, so as to make each " spoke form a portion of the wheel."

An arrangement is described, in which a mass of heated metal is placed in the central part of a mould furnished with radiating slots, and then acted upon by a ram or rams, so as to force portions of the metal into the slots, these portions forming the spokes of the wheel and also the felloe or rim, radiating arms being in the first place formed of much greater length than is requisite for spokes only, and the surplus length of each being then so bent as to form the requisite portion of rim between that spoke and the next. An arrangement of racks and pinions, or sliding blocks furnished with screws, may be used to cause the radiating arms to be produced of an uniform length, the bending of the arms being effected by turning round the mould and bringing portions of the arms into contact with certain projections connected with a bed plate on which the mould is mounted. The patentee, however, does not confine himself to any particular mode of carrying out the invention.

[Printed, 10d. Drawing.]

A.D. 1854, September 23.—N° 2052.

BANKS, THOMAS, and BANKS, HENRY.—"Improvements in " apparatus for retarding and stopping railway trains."

This invention consists of improvements upon the invention for which a patent was granted to the present patentees on the 26th of July, 1853, the latter consisting essentially in the employment of a central disc surrounding each axle of a railway vehicle, but not revolving therewith, there being on one side of this disc another disc, keyed upon and revolving with the axle, and on the other side a disc also revolving with the axle, but capable of



sliding to and fro on a feather therein, this sliding disc being pressed when necessary towards the other discs, and friction being thus created between the surfaces of such discs and those of plates of wood mounted between them. The main difference between that arrangement and the present invention consists in making, in the latter, both the outer discs moveable upon the axle, the levers and other apparatus by which the discs are brought into contact being so modified that both of such outer discs may be moved towards or from the central disc simultaneously, the two inventions in all other respects being substantially the same.

[Printed, 1s. 6d. Drawings.]

A.D. 1854, September 25.—N<sup>o</sup> 2059.

MARSHALL, WILLIAM. — (*Provisional protection only.*)—"An improvement or improvements in metallic wheels for railway and other purposes."

In carrying out this invention the inventor employs pieces of sheet iron or other metal, of any required thickness, having the figure of a semicircle, quadrant, sextant, octant, or other division of a circle, and by the use of dies and pressure forces a rib or ribs into such piece of metal, such rib or ribs being in the direction of radii of the circle of which the piece of metal forms a part. A suitable number of these pieces, with their ribs, are then placed together to form a wheel, the whole being bound together by a circular bar, fixed around them by pressure. In arranging the pieces to form the wheel they are so contrived that the ribs of one piece shall be convex and those of the next concave "the concave cavity and convexity alternating with the several pieces."

[Printed, 4d. No Drawings.]

A.D. 1854, October 4.—N<sup>o</sup> 2130.

CHALMERS, DAVID.—"Improvements in the mode or method of working railway breaks, and communicating signals."

This invention consists in "attaching a lever and weight to the centre shaft of the break," such lever and weight being worked by means of an endless chain and pulley, the said chain and pulley operating upon the break blocks by means of a shaft "with one or more universal joints placed longitudinally under the carriage, extending to each end thereof, and communicating with a vertical shaft at the end or side of the carriage by means of bevil

"wheels or similar contrivances." The vertical rod or shaft "may extend to the top of the carriage, or may terminate at any convenient position, and the person in charge of the breaks gives a revolving motion both to it and to the longitudinal shaft "by turning a wheel," thus acting upon the pulley and chain for the purpose of raising or lowering the lever and weight, as may be required. In order to work a number of breaks simultaneously the longitudinal shaft of one carriage is connected with that of another by means of "sliding socket joints or bell-mouthed couplings so that the said joints or couplings will slide in and out with the buffer rods," this mode of connection giving to the person in charge of the breaks "the power of working any reasonable number of them that may be required."

In order to communicate signals between the guard and engine driver, or from one part of a train to another, the patentee fixes, "along the top, bottom, or side of each carriage, a tube made of india-rubber, gutta percha, iron, brass, or other metal or material," and connects the same "by a simple socket or slip joint, which, as soon as it is inserted in its place is tightened by means of a thumb screw or a lever and catch, to keep it airtight, thus forming a continuous and perfect speaking tube, by which the guard can communicate with the engine driver, and vice versa; or, if desirable, a connected branch tube may be placed in each carriage, to give the passengers the power of communicating with the guard or engine driver."

The details of the invention are minutely set forth.

[Printed, 1s. Drawings.]

A.D. 1854, October 4.—N° 2131.

GAULTON, WILLIAM PEEL.—"Improvements in breaks applicable to railway carriages and other vehicles."

This invention consists "in a simple and expeditious mode of securing the wooden friction blocks which are employed in carriage breaks to the usual contrivances and mechanism" by which they are forced against the wheels, the patentee employing for this purpose "a cramp or frame, having toothed or fluted-faced jaws, which are made to close by the action of screws or wedges. The wooden block is vertically or otherwise placed between the jaws, which on closing force their serrations or teeth into the

" ends of the wood, and, by thus gripping or pinching, the block  
 " is effectually held and secured, and the screws or wedges are  
 " then prevented from retreating by the use of lock nuts or  
 " cotters."

The patentee mentions several advantages as arising from the use of this system of securing the blocks, the details of which are described under different modifications. The fixing of such blocks "without the use of screws or bolts passing through or into them" is mentioned as an important feature of the invention. The improvements are described with reference to the breaks of railway carriages, but may be applied to other vehicles, and in other cases in which "retarding friction" may be required.

[Printed, *ed.* Drawing.]

A.D. 1854, October 10.—N<sup>o</sup> 2169.

KERSHAW, JOHN. — "Improvements in the manufacture of wrought-iron railway wheels."

This invention relates to the manufacture of wrought-iron railway wheels, "either with discs or with spokes." Several distinct processes are employed. The boss or nave is made by piling pieces of iron and welding them together by means of a hammer and dies or moulds, so formed as to produce a nave of the shape required, with a web or fin around it to which the spokes or disc may be afterwards welded by tools adapted to the form of wheel.

An annular disc is provided, or spokes are formed from a disc, "the inner circumference corresponding with the web on the nave, and the outer circumference with the web on the tyre. The tyre is formed by rolling, and has a projecting web or fin formed thereon, to have welded thereto the disc or spokes by means of tools of such a form as to effect a weld round the whole circumference at one or more processes of welding; or the several parts may be brought together by one process of welding, and the same result produced, *videlicet*, a solid wrought-iron wheel, consisting of a nave, a disc (or spokes), and tyre, which being first made separate, as above explained, are at one or more processes welded together, as described."

The tools employed may be varied, and a furnace is described which may be used for heating the parts before welding.

[Printed, *10d.* Drawing.]

A.D. 1854, October 11.—N° 2177.

**CRUISE, ROBERT.**—"Improvements in machinery or apparatus " for stopping railway carriages."

According to this invention the break van of a train has fixed underneath it guides in which are mounted longitudinal bars provided with racks, there being two bars on each side of the van, and a shaft extending across the van being provided with two pinions, one of which is in gear with the racks of both the bars on one side, and the other pinion in gear with the racks of the other bars, the arrangement being such that on turning the shaft in one direction the bars are all moved outwards, while on turning it in the other direction they are drawn inwards. On each of these bars is a break block, not affixed thereto, but capable of sliding thereon, and connected to a spring, the result being that on the bars being moved inwards these blocks are pressed against the outsides of the wheels through the medium of the springs, while on the motion of the bars being reversed they are drawn away from the wheels by the springs attached to them, other springs attached to bars which pass across the van, and unite the longitudinal bars together in pairs, also aiding in the withdrawal of the breaks, and afterwards keeping the bars in a "definite position." From the two cross bars project hooks, and these are connected, by ordinary screw couplings, to other hooks attached to other cross bars, which unite longitudinal sliding bars mounted below the carriage in front of and that behind the tender, these bars carrying break blocks, mounted upon them in a manner similar to those of the tender, but the carriages having a break block on each side of each wheel. The result is that when the bars of the tender are moved inwards, as mentioned above, not only are the breaks of the tender applied, but those in front of the wheels of the carriage in front of such tender, and those at the back of the wheels of the carriage behind the tender; these arrangements being capable of extension, by means of suitable couplings, to as many carriages of the train as may be necessary. This arrangement may, however, be modified as regards the carriages by mounting the break blocks between the wheels, and so connecting them with links and levers that on the longitudinal bars being moved in either direction they will bring the whole of the breaks into simultaneous operation, through the medium of springs and certain bosses carrying pins.

The shaft carrying pinions, mentioned above as being employed to move the longitudinal bars under the tender, is operated upon through the medium of a large toothed wheel, which is fixed thereon, and turned by a worm, the latter being upon another shaft upon which are two bevil wheels, one much smaller than the other, and there being in gear with these two bevil pinions one, which is in gear with the smaller wheel, being upon an upright shaft to which motion may be given by a "pulley handle," and this communicating a quick movement to the apparatus, while the other pinion, which is upon a hollow shaft placed on the upper part of the first, communicates a slower movement, but exercises greater power than the first. This arrangement may be applied to the working of other than railway breaks, and the breaks here described may, on the other hand, be operated by other means.

Printed, 10d. Drawing.]

A.D. 1854, October 18.—N<sup>o</sup> 2225.

EASSIE, WILLIAM.—(*Provisional protection only*).—"An improved means of securing goods or loading in or on railway trucks or waggons."

The inventor proposes to use "an improved kind of latch or bar lock, chiefly applicable for the flaps of lime or coal waggons or trucks," instead of the chain and peg ordinarily employed. He proposes to cut in the headstock or sole bar a long groove, in which a long iron bar "can be slid three inches or so in a side-ward direction, and in which occasional notches are made, such notches occurring in near proximity to where the long hinges depend." On moving a lever by which the iron bar is slid along, "the hook on the end of the hinge iron" is brought opposite to an aperture in the bar, "and thus opened; or if wanted to be fastened, the lever is turned over the back of flap, and thus becomes immediately locked. The position of the working lever is so contrived that it partly forms in itself the purpose of a holdfast, by being made to turn over in the end of the flap."

[Printed, 4d. No Drawings.]

A.D. 1854, October 24.—N<sup>o</sup> 2263.

SOMERBY, GUSTAVUS ADOLPHUS, and FOGG, CHARLES WILLIAM.—"An improved brake apparatus for railway carriages."

According to one part of this invention, the journals of the axles of a railway carriage are each mounted in "pendulous bars" or bearings," so as to enable the axles to be moved slightly towards each other, and thus press the wheels against brakes when requisite. Between the wheels on each side of the carriage, brakes are mounted, there being one to each wheel, and each brake is connected to one end of a lever placed in a nearly horizontal position, the other end being jointed to a projection from the framing, and each lever between its fulcrum and brake bears against the lower end of a coiled spring, which envelopes a rod projecting downwards from one end of another lever, at the other end of which is another brake mounted above the wheel, there being thus a brake to each wheel at one side, and another above such wheel. These arrangements are such that upon either of the axles of the carriage being allowed or caused to move slightly towards the other and so press the wheels of that axle against the brakes inside them, those brakes will be moved slightly upwards, and the levers connected to them will so act upon the coiled springs above them and the rods enveloped by them, that the brakes above the wheels of both axles will be brought into action also, the levers of the last-named brakes being so arranged as to act simultaneously upon the bringing into action of the lower brakes of either pair of wheels.

In connection with these arrangements, which are meant to be brought into action by the momentum of the carriage, are certain other and somewhat complex arrangements of cams, friction rollers, levers, tripping and other catches, and sliding rods acting as buffer rods, the object of these parts of the invention being to cause the wheels to be released from the brakes by the action of "the power that produces draft of the carriage," the patentees apparently meaning that although the brakes are to be brought into action by the momentum of the carriages causing them to tend to overrun the locomotive power, and be again taken out of action on such tendency ceasing, the apparatus is at the same time to be so under the control of the attendants of the train that they may regulate its operations as may seem desirable. The details of the invention are set forth at some length, and include a mode of connecting the apparatus of one carriage with that of another through the medium of shafts, which are connected by a "clutch dog," or some equivalent contrivance. These details,



however, will only be understood with the aid of the drawing annexed to the Specification.

[Printed, 8d. Drawing.]

A.D. 1854, October 31.—N° 2316.

CRAIG, ARCHIBALD.—“Improvements in the manufacture of “railway wheels.”

This invention relates to bending into shape the spoke bars and welding the tyres of wrought-iron railway wheels, and has reference more particularly to wheels of that class in which “the “spokes are formed by bars of wrought iron bent into triangles, “the middle of the bar lying against the inside of the tyre, “whilst the ends extend to the boss and form the spokes.” According to one arrangement for bending the spokes, a traversing carriage is mounted upon a bed plate, and worked to and fro by means of a crank or other suitable mechanism. On the carriage is a block “formed to the shape of the inside of the “triangle, that is to say, so as to file the inside of the spoke bar “when bent into shape,” and opposite to this is a block “for “shaping the outside of that portion of the spoke bar,” this block being fitted in slides, and capable of being made to approach towards or recede from the first, there being on each side of the sliding block a block “for acting on the outsides of “the ends of the spoke bar. The two side blocks turn horizontally upon pins carried by the traversing carriage, and they act “upon the spoke bar by turning against it and gradually bending “it into the proper shape, the bar being put into the machine in “the form of a straight bar. This action is effected by the “traverse of the carriage, and by means of a pair of anti-friction “pulleys carried by the stationary framing. The side blocks are “made triangular in shape, and when the carriage is traversed “between the stationary pulleys the outsides of the blocks come “in contact with the pulleys, and are thereby made to turn in “upon the spoke bar, and to gradually bend it into shape. On “introducing the bar the side block is shifted back, to allow it to “be entered in a straight form, and when the machine is in action “this block is made to advance by a self-acting movement, so as “to give the requisite bend to the bar at that part.” The machinery is thrown out of gear by a self-acting movement when the shaping of the bar is effected, the bar being then thrust

upwards by suitable means, and removed. This arrangement may be modified by causing the frame carrying the shaping blocks to be stationary, and traversing the side pulleys. According to another modification, the side blocks may be connected directly to and worked by cranks; or, again, the side blocks may be worked by hand, in which case they may have sockets formed in their ends to receive hand levers, and when the ends approach each other they may be connected by a screw or screws, by means of which they may be still further compressed or held together. The slide block for acting on the outside of the circumferential portion of the spoke bar may be adjusted up against the bar by means of a screw arrangement, or it may be connected to the other moving parts, so as to act simultaneously with them.

In welding tyres according to this invention, the tyre having been bent to the proper shape, and being held in the ordinary manner, "is heated at the point of junction, and is inserted and held between a pair of rollers, shaped respectively to the inner and outer sides of the tyre. These rollers are carried by a frame capable of oscillation about an axis coincident with the centre of the tyre," and this frame is made to oscillate by suitable means through an arc of sufficient extent to enable the rollers to act upon the heated parts of the tyre, this motion being continued until the weld is effected. Instead of this arrangement, the frame carrying the rollers may oscillate on the axis of the inside roller, and the lever by which the oscillation is produced may be fixed either to the spindle of the lower roller or to the frame. When the lever is fixed to the spindle of the roller, the frame in which the rollers are carried may be stationary, the action of the rollers causing the tyre to reciprocate; and the same effect may be produced by fixing the lever to the upper roller. The bearings of one or of both of the rollers must be adjustable in order to admit of the introduction and removal of the tyre, and the rollers may be pressed towards each other by screws or springs, or otherwise.

[Printed, 1s. 8d. Drawings.]

A.D. 1854, October 31.—N° 2318.

OSBORNE, THOMAS, and ELDRED, WILLIAM.—"Improvements in apparatus for retarding and stopping railway carriages."

In this invention the apparatus for stopping a train of carriages is so arranged as to act upon only one or upon several carriages simultaneously, as may be required. "For this purpose, on one of the axles of a railway carriage (whether a passenger or other carriage) are placed two cones, which revolve therewith, but are capable of sliding thereon," and between these cones is placed a hollow drum, the hollow ends of which correspond with the cones on the axle. The hollow drum is kept suspended, so that its interior conical surfaces are at a distance from the revolving cones, and it will be stationary and not rotate in its bearings till necessary to put on the breaks. The two cones are arranged in such manner as to slide towards each other, and thus enter and fill the interior of the drum, and offer such a friction as to cause the drum to rotate with the cones, for which purpose two screws on an axis act on nuts carried by levers, which move the two cones. The screw axis is put in motion by another screw, acting in a screw wheel fixed on the screw axis, which moves the levers. To the outer surface of the drum are fixed two cords, and they pass round it in opposite directions. To the other ends of these cords is fixed another cord, which passes round the breaks, which are formed in two parts, each partly embracing another axle of the carriage, and these parts are suspended on hinges or joints, and kept apart by springs, in such manner that they will not come into action and bind on the axle till the drum is put in motion, and one of the cords thereon wound up. The cord, having passed round one set of breaks may then pass on and be connected with any number of breaks of other carriages, by other cords passed round such other breaks; but the first-mentioned cord may be prevented acting on more than its own break, when desired, by a suitable stop interposed by a handle and connecting rod. In place of the breaks acting directly on the axle, they may act on bosses or enlargements formed on the axle."

[Printed, 6d. Drawing.]

A.D. 1854, November 1.—N<sup>o</sup> 2322.

ROBB, JAMES BIRSCH.—(*Provisional protection only.*)—"Improvements in brakes or retarding apparatus." This invention relates to a brake for railway purposes, and consists in the em-

ployment of friction pulleys or rollers, which are mounted at the ends of shafts passing across the carriage framing "near the surface of the rails," these shafts being placed in bearings which are capable of being moved so as either to bring the friction pulleys into contact with the rails and also with the running wheels of the carriage simultaneously, or to remove them therefrom. When the pulleys are placed in contact with the wheels and the rails, the latter tend to cause them to revolve in the same direction as the wheels, while the latter force them to rotate in the opposite direction, great friction being thus produced both upon the rails and the running wheels, and the movement of the carriage being consequently retarded. The shafts of the friction pulleys may be arranged in various modes. They may be supported in bearings carried by metal plates, suspended from the axles of the carriage and connected by toggle or knee-joint levers to other levers which may either be acted upon by hand, or by the buffers of the carriage, or they may be connected to "vertical rods running direct up the framing." Each friction pulley is mounted upon its shaft through the medium of a "conical collar" upon which it works, the hub of the pulley being bored to correspond therewith, and the collar is made in two parts, with a slight space between them, this arrangement being such as to "allow of subsequent tightening up, and afford space for lubricating matter."

[Printed, 4*l*. No Drawings.]

A.D. 1854, November 1.—N<sup>o</sup> 2323,

NEWTON, ALFRED VINCENT.—(*A communication.*)—"An improved method of forging or swaging railroad carriage and other wheels."

The object of this invention is to make wrought-iron flanged wheels "in one piece, by swaging or hammering from one piece of heated metal," and the invention consists in swaging or hammering such metal into the form required "within a die box or anvil of the reversed form of one face of the wheel, the rim or head, and one face of the flanch, by means of a hammer of the reversed form of the opposite face, rim, and flanch of the wheel, when the said hammer or anvil is made to rotate with an intermittent motion between the blows of the hammer. The face of the hammer is waved in the line of a circle concentric with the hub, that is, formed with alternate projections and

" recesses extending from the hub to the rim, or nearly so; the  
 " effect of which projections and depressions, in combination with  
 " the intermittent rotary motion of the anvil, die, or hammer  
 " swage, is to spread the metal towards the circumference, and  
 " thereby insure the reduction of the thickness of the block of  
 " iron between the hub and rim, and, forcing it to the rim, to  
 " form a solid and compact tread and flanch."

The invention is minutely described, but the "special structure  
 " of the parts," as well as the means employed for operating  
 them, may be varied at pleasure.

[Printed, 8d. Drawing.]

A.D. 1854, November 3.—N° 2330.

PARSONS, PERCEVAL MOSES.—(*Provisional protection only.*)—

" Certain improvements in railway carriage axle bearings."

This invention consists in making such axle bearings "of  
 " various suitable kinds of hard wood, either in their natural  
 " state or impregnated with aqueous, alkaline, oleaginous, sapo-  
 " naceous, or metallic solutions."

The inventor mentions various advantages which may be  
 expected to arise from his improvements, stating in particular  
 that wooden bearings will be less expensive than metallic ones,  
 and that a cheaper lubricant will serve for such wooden bearings  
 than the lubricant usually employed for metallic bearings, one  
 object of impregnating the bearings as mentioned above being to  
 give them a certain amount of lubricating material within them-  
 selves, and render them less liable to take fire in case of over-  
 heating, as well as increase their hardness and durability.

[Printed, 4d. No Drawings.]

A.D. 1854, November 7.—N° 2359. (\* \*)

BEARDMORE, WILLIAM.—" An improvement in the bearings  
 " of the axles of railway carriages and locomotive engines."

Constructs the bearings of the axles of railway carriages and  
 locomotive engines of wood; and arranges the boxes and parts  
 connected with them so that a constant supply of water may be  
 kept up to lubricate the wooden bearings. A portion of water is  
 contained in the box, and a small roller is in contact with its  
 surface, and also with the lower surface of the axle, as this rotates  
 the small roller in contact with it rotates also, and its wetted



surface keeps the surfaces of the axle and wooden bearings lubricated with water.

[Printed, 8d. Drawing.]

A.D. 1854, November 8.—No 2372.

CRANSTOUN, CHARLES DALRYMPLE. — "Improvements in  
" coupling and uncoupling railway carriages and rolling stock."

This invention relates to "so arranging the connecting details  
" of railway carriages and wagons that the attendants may effect  
" the necessary actions of coupling and uncoupling in the most  
" complete manner without involving the necessity of passing in  
" between the carriages and wagons, whilst the said operations  
" may also be accomplished with much greater facility and speed  
" than by the existing systems. Each carriage or wagon, in addition to a central hook as a draw link, has attached to it three  
" parallel jointed engaging chain links, freely hinged, so as to be  
" capable of being raised or lowered at pleasure. These links are  
" made with a central back stop joint, in such manner that whilst  
" they will act with all necessary flexibility when drawing or  
" being shifted in certain directions, yet, when lifted by the  
" elevating lever, they will rise in rigid condition, as if solid." Such draw links may either be disposed in sets of three at each end of the carriage or wagon, or at one end only. "A transverse  
" coupling or elevating shaft is disposed in bearings beneath each  
" set of links, this shaft having upon it a lever frame-piece, with  
" stud projections thereon, for the purpose of giving the lift to the  
" links. Each end of the shaft carries a hand lever, conveniently  
" disposed for the hand of the attendant, so that when passing  
" along the train he can quickly lift or lower the links, holding  
" pins being provided for setting the levers at the required point.  
" When the carriages are to be coupled they are placed together  
" in the usual manner, and the main centre draw-link and the  
" two external safety chain links being slackened off sufficiently,  
" the attendant, by means of one of the projecting hand levers of  
" the adjusting shaft, lifts the whole of the links sufficiently high  
" to clear the three corresponding hooks on the next carriage,  
" and then, letting the links drop, he thus effects the necessary  
" engagement between the links and hooks, and couples the  
" carriages. Then, to tighten up the central draw-hook link, a  
" transverse hand wheel shaft is fitted upon the carriage frame.



“ the centre of this shaft having upon it a worm, gearing with a  
 “ worm wheel, set on a longitudinal nut link of the draw-hook  
 “ spindle ; hence, by turning one or other of the hand wheels, the  
 “ necessary tightness is easily secured. This gearing may be  
 “ modified in various ways ; for instance, the worm wheel may  
 “ itself be made to answer as the tightening nut. When the  
 “ carriages are to be uncoupled the links are slackened off, and  
 “ the attendant then lifts the links clear off the hooks, and allows  
 “ them to drop to a vertical position by the converse of the  
 “ operation previously described.”

The details of the invention are very fully set forth.

[Printed, 1s. Drawings.]

A.D. 1854, November 14.—N<sup>o</sup> 2405. (\* \*)

**LUSON, JOHN HEWLING.**—(*Provisional protection only.*)—

“ Improvements in brakes for railways and other like purposes.”

These improvements are thus defined :—

“ My invention consists in a peculiar hydrostatic arrangement,  
 “ by means of which I am enabled to actuate the brake blocks  
 “ for stopping railway carriage wheels and cranes, and for other  
 “ like purposes.”

“ When it is required to press two brake blocks in opposite  
 “ directions, as between two side wheels of a railway vehicle, I  
 “ recommend the upper end of the brake block to be attached  
 “ to the framework of the carriage, and suspended from suitable  
 “ brackets. I arrange a cylinder horizontally, having two plungers,  
 “ one at each end, the outer ends of the plungers being  
 “ attached to the brake blocks. In the side of the cylinder is a  
 “ pipe for admitting water thereto between the two plungers  
 “ when applying the brakes, and a stop-cock for letting out water  
 “ to release the brakes. The cylinder and its plungers being fitted  
 “ water-tight, is connected by the aforesaid pipe with the feed  
 “ pump of the engine, or may be worked by other means,  
 “ and may be supplied with water from the tender, or from an  
 “ independent cistern provided with requisite valves, operated by  
 “ manual labour applied to a weighted lever, or by other means,  
 “ for the purpose of applying the brake or brakes.”

“ I propose to work all the brakes in a railway train simultaneously by means of one force pump, the water pipes between  
 “ one vehicle and another being connected by flexible tubing.”

" My improved brakes may be considerably modified, and are applicable to single wheels, and also to cranes, and for similar purposes. The novelty of my said improvement consists in the peculiar adaptation of the hydrostatic arrangement described."

[Printed, 4s. No Drawings.]

A.D. 1854, November 17.—N° 2443.

BOUSFIELD, GEORGE TOMLINSON. — (*A communication.*)—  
" Improvements in the manufacture of wrought-iron carriage and other wheels and pullies."

This invention has for its object the raising up of a tread or flange on the outer periphery of a disc of wrought iron. The patentee mentions in the first place that various attempts have been made to accomplish a like result, but that in all cases the endeavour has been to shape a flanged disc from a mass of metal or blank, "of no greater diameter, or smaller in diameter, than the finished article," and that in all cases, whether the operation was effected by stamps, or by dies, or by rollers, the metal "has been stretched on its outer periphery, and either become cracked or of less density," the consequence being that the article produced was defective. He then states that according to the present invention a blank is used, which is larger in diameter than the finished article is meant to be, and that it is "compressed centripetally by rollers or otherwise, squeezing it up, and, as blacksmiths term it, upsetting the periphery until a flange is formed thereon," the blank during the operation being either withdrawn from the machinery and repeatedly heated, or being maintained at a constant heat by a furnace arranged in connection with the apparatus by which the operation is performed. This apparatus may be varied, but a machine is described as being by preference used, which consists mainly of a central shaft or mandril supporting the heated disc and capable of rotation on its axis, and of two other shafts parallel thereto, each carrying a swedging-up or compressing roller, and mounted in moveable bearings, by which means their distance from the central mandril may be varied. And as a means of forming a neatly finished tread or flange, there are likewise employed "two sets of supporting and forming rollers, which apply themselves under the flange as it is being formed, or against its edges;" these latter rollers being capable of motion in two directions, either perpendicular to the

plane of the disc or nearly so, and to and from its centre. "All these rollers are, so to speak, die rollers, and a proper configuration of their peripheries will produce flanges of almost any desired shape, whether for wheels or pulleys, or for a partial wheel tread, upon which an ordinary tyre may be shrunk."

The details of mechanism which may be used in carrying out the invention are described at some length, but are all capable of variation. A nave or hub may be added to the wheel "in any known way," or may be produced by the use of an expanding mandril, or a rotating excentric, or a roller revolving on an arm, the length of which may be varied during the process, and the blank may be treated, if desirable, in a cold instead of a heated state. The invention is apparently meant to relate mainly to the production of wheels for railway purposes, such wheels, and such only, being represented in the drawings annexed to the Specification as being produced by the process set forth.

[Printed, 1s. Drawings.]

A.D. 1854, November 27.—N° 2498.

**FONTAINEMOREAU, PETER ARMAND LE COMTE DE.**—(*A communication from Messieurs Deflassieux, Peillon, and Brothers.*)—"Improvements in the manufacture of wrought-iron wheels for locomotives, or railway, or other carriages."

This invention consists in the use of moulds of cast iron, steel, or other suitable metal by means of which the different parts required to form a wheel, and which have been previously forged separately, "such as the nave, spokes, and jaunts, or circumference, with or without flange, and also every piece which it may be more suitable to make adherent to the wheel, such as crank or excentric, are adjusted together at the same time and by the same operation, so that the wheel forms one piece of wrought iron. When it is desired to cover the circumference and other parts of the wheel with steel, bands of that metal must be added to the assemblage."

The parts of the wheel having been laid together the whole are heated to a white heat, and then driven into a mould by a powerful hammer. The wheel thus partially formed is then taken out of the mould and again heated, turned upside down, and replaced on the same mould, into which it is again driven by the action of a hammer having on its face a second and similar mould, this completing the operation; the sharp edges of the two moulds

cutting away any excess of metal which may exist in any part of the wheel. If desired hydraulic pressure may be used in the process.

[Printed, &c. Drawing.]

A.D. 1854, December 1.—N° 2529. (\* \*)

WILSON, THOMAS.—(*Provisional protection only.*)—"Preventing the noise in omnibusses and other carriages travelling on common roads, streets, and railways." It consists of the introduction of india-rubber blocks between the axletree and springs, in place of the wooden blocks now in use. Also to prevent the noise arising from the windows, by lining the said windows and frames with india-rubber.

[Printed, &c. No Drawings.]

A.D. 1854, December 11.—N° 2604.

CRAIG, WILLIAM GRINDLEY.—"Improvements in railway axle boxes and spring fittings."

The first part of this invention consists "of a new description of axle box grease cover, in combination with a separate cup and plug, to prevent the entrance of dust, grit, and other materials injurious to the bearings." The lid of the axle box is composed of a plate of iron which comes between the springs and the box, and is provided outside the springs with a grease cup, which is secured to it, and also to a piece of wood in combination with it, the grease cup being furnished with a plug, at the upper end of which is a loop to which a chain is linked which is attached to the carriage, this preventing the plug from being lost. On the upper part of the brass or bearing is a hollow projection, and between this and the plate which forms the lid of the box is a strip of india-rubber or other elastic material, "in order to obviate the evils of jarring," the brass being provided with suitable passages through which the lubricating material proceeds from the grease cup to the journal of the axle.

That part of the invention relating to spring fittings consists in the first place in the application of "sliding shoes" to the ends of not only bearing springs, but also of buffer and draw springs, these shoes being attached by means of bolts to the turned-over ends of the springs, and sliding upon a suitable bed attached to the framing of the carriage; this part of the invention

also including clips or straps for bearing springs, which are so constructed as to be secured to the springs and axle box by cotters, the space between the latter forming a recess for the reception of the hollow projection mentioned above, and which constitutes "the head" of the bearing.

[Printed, 10d. Drawing.]

A.D. 1854, December 15.—No 2646.

**STRONG, EDWARD.**—"Improvements in removing and replacing  
" the wheels and axles of locomotive engines and other rolling  
" stock of railways."

This invention relates to contrivances for facilitating the operations of the engineer "in his periodical examinations, removal, and replacing of the wheels, axles, and bearings of locomotive engines and the general rolling stock of railways," by which all screwing or tilting up of engines or stock is dispensed with. According to one modification of the invention a "screw lifting and lowering frame" is placed in an excavation beneath the level of the railway, "so that the wheels and axles may be removed and replaced by descent and ascent from and to the engine or carriage without disturbing the main body of the engine or carriage itself. A transverse excavation is made beneath the level of the rails, and the rails are carried up this excavation on each side. The gap thus left in the line of rails is capable of being fitted up at pleasure by rail lengths fitted upon the top of the raising or lowering frame." The engine or carriage to be operated upon is run along the line until the wheels and axle which are to be removed are directly over the pit, these wheels being temporarily supported by the bearing rails of the operating frame, which has previously been brought to the "top of its lift." The pit frame consists of an open rectangular bottom frame piece, carried on four small running wheels, supported by rails set transversely to the main line of railway at the bottom of the excavation. On this frame are four vertical screw spindles, on which work four nuts carried by the ascending and descending frame, all these screws being so connected by gearing as to be driven in concert by a hand wheel, and by turning this wheel the moveable frame is made to descend into the pit, carrying with it the axle and wheels which it is desired to remove, and which have been previously disconnected

or set free from the engine or carriage. The axle and wheels can then be examined and replaced, the bearings being renewed if needful, or if it be necessary to substitute a fresh axle and fresh wheels for those which have been examined the latter may be removed by running the lower frame upon the transverse bottom rails until the track of another line of rails is reached, when the frame being raised the axle and wheels thereon may be removed, and replaced by others, and these then taken back to the engine or carriage "by reversing the action of the arrangement."

These arrangements may be modified. In cases where it is desired merely to facilitate the examination of the axles and brasses, by separating the parts for a short distance only, a common pit or recess with an ascending and descending frame is all that is required, and different modes of actuating such a frame may be used. The invention may be conveniently carried out on a large scale, where several lines of rails are placed parallel to each other, by carrying the transverse excavation under the whole of such lines, or under any number of them, so that the apparatus may be brought into use at such points as may seem convenient, the lines of rails being rendered continuous, when the apparatus is not in use, by suitable filling up rails.

[Printed, 1s. 2d. Drawings.]

A.D. 1854, December 16.—N° 2654.

EASSIE, WILLIAM.—(*Provisional protection only.*)—"Improve-  
ments in means of stopping or retarding vehicles used on  
railways."

In this invention a rod, "with a joint coming through the  
buffer and working with it, actuates a vertical lever, this lever  
being connected with the break block by means of a rod with a  
number of teeth fitting on a pin fastened at the bottom end of  
that vertical lever, and by means of a horizontal shaft running  
through the centre of the waggon, worked by means of a lever  
and connecting rod with another shaft running across it, also  
having two levers and two connecting rods, one at each end,  
and joined to the rod before mentioned, in which teeth are cut,  
so that by giving the longitudinal shaft a slight turn the rod  
with teeth in is lifted up clear of the pin of the vertical lever,  
after which the pressure may come against that lever, but



" when working clear of the teeth does not act upon the break. Again, in putting a bar across from one axle box to the other, fastened to them by a single pin or set screw, so that the bar may move freely up and down with those boxes," the inventor provides means of keeping " the break always in the centre of the wheel," the break having a loop at its upper end, and a pin working therein, " yet still allowing it to slide up and down," as well as having a slot in its side " sliding on the bar before mentioned," the bar moving with the axles in all cases, and the break being " sure to wear as well as fit exactly in the same places." Again, " by means of a T-shaped handle on the end of the longitudinal rod connecting the two breaks together, which fits into a coupling box made so as to correspond with the T, a method is employed not only of joining the breaks of the waggons together, but of allowing the rod to be turned a little round, whereby the teeth can be raised above the pin in the vertical lever, and that lever, being acted upon by the buffer, loses its action over the break, the joints allowing plenty of play for any irregular position of the waggon on the rails."

[Printed, 4d. No Drawings.]

A.D. 1854, December 21.—N<sup>o</sup> 2698.

JOHNSON, JOHN HENRY.—(*A communication from Hippolite Ulysse Petin and Jean Marie Gaudet.*)—"Improvements in the manufacture of railway and other wheels."

In this invention a round boss is first formed by coiling a bar of trapezoidal form round a central mandril or cylinder, this boss being then placed in a heated state upon an anvil, and a "metal shaping ring" being laid upon it, which is struck by a suitably shaped hammer, the anvil forming one face of the wheel and the hammer and ring the other. The wheel thus "roughed out" is then raised to a white heat and transferred to a rolling mill, in which rollers having both a rotatory and a horizontal movement complete the formation of the wheel, for which, however, may be substituted rollers having only a rotatory motion, the wheel, during this part of the operation, being supported in bearings so contrived as to give to it a "horizontal backward and forward motion," the result in both cases being the same. The rollers may be variously shaped according to the form of wheel desired,

and wheels may thus be produced either "with a flange in one piece with it," or of suitable shape for the reception of a separate flange or tyre, which may be placed thereon in the ordinary manner. The details of this rolling apparatus may be varied, several modifications of mechanism suitable for the purpose being described by reference to drawings annexed to the Specification, in each of which the apparatus is driven by a small steam engine. These arrangements, however, will only be clearly understood with the aid of the said drawings.

[Printed, 1s. 4d. Drawings.]

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A.D. 1855, January 3.—N<sup>o</sup> 20.

HUSTWICK, CHARLES, and BEAN, WILLIAM.—"Improvements in buffers and springs for railway carriages and other purposes."

This invention "consists of an improved arrangement of springs, formed of curved steel plates, contained in a box to which the buffing, bearing, or drawing apparatus of railway carriages is connected, the said improvements being partly applicable to other carriages." These curved plates are arranged in pairs, with the ends in contact. Thus, in the case of a bearing spring for a railway carriage, one plate is laid with its convex side downwards, and upon the ends of that are placed the ends of a second plate having its convex side upwards. On the convex side of this latter, again, is placed another plate with its convex side downwards, and on the ends of this the ends of another plate with the convex side upwards, and so on in succession until as many plates are combined together as may be thought necessary. Buffer and draw springs are formed of plates similarly arranged, but in all cases the box in which they are enclosed must be sufficiently wide to allow the springs free play.

Although the invention is mentioned as applicable to other than railway purposes, it is described solely with reference to the latter.

[Printed, 6d. Drawing.]

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A.D. 1855, January 6.—N° 41.

EDWARDS, CHARLES JOHN, junior, and FRASI, FREDERICK. —“ An improved manufacture of bearings for carriage axles, and “ shafts of machinery in general.”

This invention relates to the manufacture of bearings from leather, to be used in place of brasses and other metallic bearing surfaces, the object being to render the bearing surfaces of plummer blocks and axle boxes more durable and less costly than heretofore. In carrying out the invention, the patentees employ, by preference, ox or cow hides, either tanned, tawed, or otherwise prepared, for one class of bearing hides being cut into pieces of suitable size for lapping half or nearly half round the journals to which they are to be applied. These pieces are compressed in half round moulds to bring them severally to shape, the required thickness of bearing being obtained by connecting two, three, or more thicknesses of leather together, these being piled in layers one above the other, and pressure being afterwards applied in a suitably-shaped mould for the purpose of solidifying the material. Bearing surfaces thus formed are by preference backed or cased with metal, the whole being securely united by leather plugs which are inserted into plug holes bored through both the metal and the leather.

The invention is described in the first place with reference to the formation of a railway carriage axle; in this case the layers of leather being united by a compound, which consists of one part by weight of isinglass dissolved in two parts of spirits of wine diluted with an equal quantity of water. An axle box for a carriage for common roads is also described as being formed in a similar manner; “ or it may be made by twisting a strip or strips “ of leather spirally round a conical core, like the end of the axle “ to which it is to be applied, and then submitting the so-coiled “ leather to pressure.”

[Printed, &c. Drawing.]

A.D. 1855, January 8.—N° 42.

CRAIG, WILLIAM GRINDLEY. —“ Improvements in railway “ buffer cases and rams.”

This invention consists, firstly, in a mode of making buffer spring plungers “ partly of wood and partly of metal, wrought iron “ being preferred, which forms a hoop to encircle the buffer

"head," and also the case for the plunger and spring, there being on each side of the hoop slots through which two eccentric or L-headed bolts are passed, which limit the action of the buffer head. The buffer spring is partially enclosed by a second block of wood, which is hooped with iron, and forms "the wearing surface for the plunger to work on," the arrangement being such that on the spring being subjected to a violent blow or concussion it enters entirely within such second block, the buffer head then coming into contact with such block, and the spring being thus preserved from injury.

"It will be understood from the foregoing description that it is necessary to place the plunger with the spring and the two eccentric-headed bolts over the spring seat all at once, and when the eccentric-headed or L bolts are screwed up to the headstock or frame end, the whole is completed." The block of wood which serves at the receptacle for the buffer spring is "placed endways of the grain," and the patentee mentions various advantages as arising from the arrangements set forth."

[Printed, 1s. 2d. Drawings.]

A.D. 1855, January 10.—No 65

FULLER, WILLIAM COLES.—"Improvements in the construction and adaptation of india-rubber springs."

This invention relates, in the first place, to certain improved methods of making suspension springs of india-rubber for carriages," and "covering and protecting the same so as to ensure greater usefulness and durability." Such springs may consist either of a ring or series of rings of india-rubber, stretched over two reels or sockets of brass or other metal, or of one continuous cord, each end of such cord being securely fastened. The rings or cords may be either of round or square section, "though for most purposes round is preferable, and the material itself should be expressly treated with a view to stretching purposes." Before securing the ends of each spring by binding, it is necessary to stretch the spring by proper machinery "to the utmost length at which it will require to be used," and while it is in this state the ends should be firmly secured, either by a binding of tape, cord, wire, or other suitable material, or by metal plates and screws, "and as the action of the spring will be confined to the middle part, the ends will be secured from friction." "Where it is necessary to use a check at the extreme distance,

" this may be accomplished by elastic webbing or cord, or by a " combination of india-rubber with cloth or canvass inserted in " the body of the spring ;" or the same object may be effected by the outer covering itself being composed of india-rubber combined with either cloth or canvas or leather, which "for the sake of " appearance" may be corrugated or gusseted. In some cases it may be desirable, instead of rings or cords, to use thin sheet india-rubber in one continuous band or tube, the ends being secured by binding or by plates and screws. Three kinds of machines are described as being applicable for stretching the springs. In one of these the spring, having been first provided with a socket at each end, is connected by means of these sockets to pins, one of which is fixed in a stationary plate, while the other is mounted upon a moveable plate, which is drawn along the stationary plate by means of a screw. In another machine the spring is stretched by means of a lever, " shaped something " like a pump handle," and in the third machine, which is meant for large springs, by a long weighted lever, the sockets at the ends of the spring being in each case placed upon pins, one of which is connected to the lever, and the other to some fixed point.

Another part of the invention relates to modes of applying these springs to carriages, " so as to produce a considerable tension or strain horizontally between the axles and scroll irons or " other fastenings, by which the body of the vehicle is attached " thereto," the object being " to secure the axles in their proper " position by the tension of the spring itself, and at the same " time to obtain a certain amount of free lateral motion, which " will give greater ease." This part of the invention is described under a great variety of modifications, and with reference both to railway carriages and to vehicles for common roads. In one arrangement applicable to railway carriages, a " stay iron " is fixed across the axle box, and two springs are each connected at one end to this iron, and at the other end to an elliptical stay, the upper side of which is connected to the framing of the carriage, and the lower side to the axle guard. In another arrangement, shackles are connected to the ends of the stay iron, these shackles being also connected to rods passing through rings of india-rubber, and furnished with suitable washers, links connecting this mechanism with an elliptical stay, such as that mentioned above. In the first of these arrangements the springs are stretched by

the weight of the carriage, but in the other arrangement the rings are compressed. In applying the springs to carriages for common roads, the patentee employs in some cases arrangements similar in character to those mentioned with reference to railway carriages, but varies the arrangement used according to the character of the vehicle. Thus he sets forth arrangements applicable to phaetons, broughams, gigs, omnibuses, and other conveyances, these arrangements including various modes of applying scroll irons, dumb irons, stay irons, elliptic bows, brackets, and other mechanism. The details of these arrangements will, however, only be understood with the aid of the numerous figures in the drawings annexed to the Specification, the invention being also mentioned as applicable to children's carriages, perambulators, velocipedes, hand trucks, and wheel barrows.

Another part of the invention consists in certain improved methods of "adapting india-rubber springs as shackles to the ends of steel springs," the object being to attain "concentration and power, combined with neatness of appearance and protection of the material." Two metal sockets or rollers, having flanges at each end, are placed near together, but not in contact, and around these a continuous band or cord of vulcanized india-rubber is wound, this being bound, between the sockets, with tape, wire, or other suitable material, a complete shackle being thus formed.

Another part of the invention relates to the adaptation of india-rubber springs "for the diminution of the recoil of muskets, rifles, and other fire-arms;" and the last part of the invention relates to the adaptation of india-rubber springs to artificial legs and crutches; but there is nothing in these parts of the invention which requires notice here.

[Printed, 1s. Drawings.]

A.D. 1855, January 19.—N<sup>o</sup> 142.

STANSBURY, CHARLES FREDERICK.—(*A communication from James J. McComb.*)—"Improvements in the construction and operation of self-acting railway breaks."

This invention consists, in the first place, in applying buffer heads, which the patentee also calls "break heads," to the working of the breaks of a railway carriage, there being, however, only one such head at each end of each carriage, and these being so arranged as not to abut against each other, but against a plate



on the framework of the opposite carriage, the patentee stating that by this means he employs "all the play between each pair of" carriages in applying the breaks instead of only *one-half* the "distance, as is the case when the break heads or buffers abut" against each other." These buffer heads are placed one on each side of the coupling apparatus of the carriage, and this "equalizes" the thrust or strain upon the platform or upon the carriages," when the momentum of the carriages causes the breaks to be brought into action. The break or buffer heads are connected with the break blocks through the medium of suitable levers, which, however, are not set forth as forming any part of the invention. Provision is made for backing a train by jointing the break heads to the rods, by means of which they act upon the breaks, and placing in connection therewith certain cords, lifting pieces, and other apparatus by which such heads may be raised so as not to come into contact with each other when such backing is being performed.

[Printed, 10*d*. Drawing.]

A.D. 1855, January 26.—N<sup>o</sup> 199.

BELL, GEORGE.—(*A communication.*)—"Improvements in constructing air springs."

The object of this invention is "by a peculiar arrangement of apparatus, together with a liquid, to render available the elasticity of air or aeriform fluids in the construction of springs for railway and other carriages, and for other purposes requiring the interposition of springs."

The patentee mentions that the highly elastic nature of air and other aeriform fluids has long since led to the suggestion of their employment as springs, but, so far as he has been able to ascertain, without practical success, owing to the difficulty of confining such aeriform fluids, and that the present invention consists "in interposing a liquid substance between the confined air and a flexible substance, by the bending of which the capacity of the containing vessel is increased or diminished, thereby effectually preventing all escape of air, either through the pores of the flexible substance or through the joints of the containing vessel." Thus instead of employing a vessel of air or aeriform fluid with a piston or plunger fitting into such vessel, as usual in the construction of air springs, a vessel is employed to one end of which is fitted an elastic diaphragm, through which a rod is passed, such rod working

in a guide, if necessary, and a liquid substance being interposed between the diaphragm and the air in the vessel, this liquid preventing the escape of air when the diaphragm is acted upon. This arrangement applies to springs which act vertically, such as bearing springs, but where the apparatus is required to act horizontally an "auxiliary" diaphragm is used along with the first, "for the purpose of confining the liquid to the same relative position as when the compressing diaphragm is at the bottom."

[Printed, 6d. Drawing.]

A.D. 1855, February 6.—N<sup>o</sup> 282.

ROBERTS, WILLIAM SANDFORD.—"Coupling railroad cars."

The object of this invention is "to form a self-coupling link to unite cars, &c. on a railway, so as to readily uncouple in case of accident, but remain secure while they are on the track, which coupling can be readily and conveniently unhooked, be strong and durable, easily constructed and repaired, and cost but a small sum originally."

The carriages to be coupled are each provided with an oblong metal box having a broad trumpet-shaped flanch at the opening, and in each box is a hook or catch, mounted upon a suitable fulcrum, and of an inclined form at the front, a link, similar to the link of a large chain, having one end inserted into one of the boxes, and the box of another carriage being then run upon the other end of the link, the catches thus laying hold of the ends of the link, and the carriages being thus united. Springs press down the front ends of the catches, so as to keep them securely in their places, and the catches are made so as to project beyond their fulcrums backwards, rods projecting downwards from the platforms of the carriages over the hinder parts of the catches, and when pressed down causing the front parts to rise, and so set free the link, the connection between the carriages being thus severed. It is stated that this effect will be produced if either of the carriages leaves the line of rails, but it is not stated whether the rods are meant to be otherwise operated upon.

[Printed, 6d. Drawing.]

A.D. 1855, February 9.—N<sup>o</sup> 306.

ADAMS, WILLIAM BRIDGES.—"Improvements in the construction and application of elastic springs for sustaining loads or

"moderating concussion in fixed or moving machines or carriages."

The first part of this invention relates to an improved mode of constructing laminated springs, or such as are composed of plates lying one upon another, the object being to dispense with "the usual appliances of central bolts or studs or of the slots and studs used to preserve the parallelism of the plates with each other." To effect this, "instead of making the central portions of the spring a series of flat planes or hollows in a line with the spring," the patentee makes them "a positive indentation, either in a sharp angle or in a curve, so that when the clips are fixed which hold the plates together they cannot possibly move endwise, nor can they, if accurately fitted, move sidewise." He states that any convenient form of angle or hollow may be used, but that he prefers "to make an angle of two lines, following the rise of the spring plates at or about ten degrees, so that in forming the plates they may all be pressed to one form in a die or mould while heated," and that "it is obvious that a short curve may serve the same purpose as the angle."

Various modifications of these springs are described, the invention including the "forming the ends of the diminishing or shorter plates square or untapered either in width or thickness, rounding them on the exterior edge, or bending them to prevent cutting in;" also, constructing laminated springs "with the diminishing or short plates in the hollow side, so that the springs will shorten their length when the load is on;" also, constructing such springs "with the plates set apart from each other to bearings in succession with increasing loads." Light springs of "double action," formed with "two central angles and curves of differing obliquity," are also described, such springs being each composed of single plates or of a number of plates, the lower plate (or plates) resting upon the axle of a carriage, and the upper plate (or plates) sustaining the load, the upper and lower plate (or plates) being connected at the ends by being notched together, or by bolts, with a layer of caoutchouc or leather between them, or otherwise. These springs may be applied in various forms to railway carriages; and the patentee further describes an arrangement of coiled springs made "to act in two several directions within a case or cylinder which retains them, so as to serve as traction springs for railway carriages," and likewise springs so constructed and applied as to "form an elastic adjustment for

" collars and half collars to railway axles, to keep in grease or oil " and exclude dirt," this being an improvement on the axle box for which a Patent was granted to the present patentee in the year 1847, the coiled springs mentioned above having been also patented by the present patentee in the year 1846, but not applied as in the present invention.

[Printed, 18d. Drawing.]

A.D. 1855, February 15.—N° 342.

**LEADBETTER, JAMES.**—(*Provisional protection only.*)—" Im-  
" provements in the mode or method of applying breaks to railway  
" and other carriages."

Instead of adopting the usual method of applying blocks to the wheels of carriages the inventor in this case proposes " to fix on " each axle or cross shaft a pulley or a toothed wheel, on which " shall act a spring connected to a draw bar or continuous chain, " which when acted upon will stop or retard the revolution of the " wheels. If pullies are used " the inventor causes " the spring " to encircle both of them," and makes a hole or slot in it, so as " to catch upon a pin or projection when the connecting rod or " chain is drawn forward by the breakman," thus stopping the revolution of the wheels. When toothed wheels are used the inventor causes the springs, " or, if desirable, two pieces of rigid " metal, with the ends turned a little, to catch one of the teeth " of each wheel when the connecting bar is drawn forward, and " thus stop the revolution of the wheels," the effect, whether a series of draw bars connected by chains are employed, or a continuous chain, being the same.

[Printed, 4d. No Drawings.]

A.D. 1855, February 16.—N° 353. (\* \*)

**MANEGLIA, FORTUNATO GAETANO PIETRO MARIA VITTO-**  
**RIO.**—" Improvements in railway carriages." These consist " in " connecting the bodies of railway carriages with the frame (to " which the wheels and axles are attached) by means of levers, " which are arranged so that the weight of the body compresses " discs of vulcanized india-rubber contained in a tube and sepa- " rated from each other by discs of metal;" and in a similar manner " the traction hooks are arranged so that the strain " thereon is caused to compress discs of vulcanized india-rubber,

" also contained in tubes and separated from each other by metal  
 " discs, and the same arrangement of elastic discs receive the  
 " shocks on the buffer through the buffer rod, which compresses  
 " the discs within the tube."

[Printed, 10d. Drawing.]

. A.D. 1855, February 23.—N° 399. (\* \*)

TAYLOR, ANDREW. — (*Provisional protection only.*)—" Self-  
 " acting railway signals and apparatus connected therewith, for  
 " improving the means of communication between persons in  
 " charge of and the drivers of trains, and to render collisions less  
 " frequent on railways."

The inventor connects the handles of the steam whistle and of the regulator of the locomotive engine by means of chains or rods passing down by the side of the fire-box, with a lever placed in such a position on the locomotive as to come in contact with " a catch," which, in case of danger, may be attached to the rail. The lower end of the lever in passing " the catch " is raised and the upper end depressed, thereby acting on the handles of the steam whistle and regulator so as to let the steam into the former and shut it off the engine by the latter. He also proposes to put on the break by a spring acting on the break handle and screw when released by a similar arrangement.

[Printed, 6d. Drawings.]

A.D. 1855, February 26.—N° 416.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—(*A communication from W. Loughridge.*)—" Certain improvements in the  
 " application of breaks on railways."

In this invention breaks are connected to levers so arranged that by raising one end of each lever the breaks are made to act upon the wheels, while on the levers being set at liberty their weight removes the breaks therefrom. The levers are each furnished with a grooved pulley, and a chain is passed from the hindmost break of the last carriage of the train over carrier pulleys, and under the pulleys of the break levers, over pulleys mounted in bearings fixed to the different carriages and under other pulleys carried by bars connected with the coupling bars of such carriages and thence to a barrel so arranged as to be driven when requisite from one of the axles of the locomotive engine, or

an axle of one of the carriages of the train, the result being, the on the barrel being caused to rotate, the chain raises the break levers and so brings the breaks into operation. This rotation of the barrel is produced through the medium of friction wheels and an arrangement of clutches, levers, and other appendages so contrived that when the breaks have been pressed against the wheels with sufficient force the action of the chain barrel ceases, the pressure of the breaks, however, being retained upon the wheels as long as may be desirable by there being a ratchet wheel connected with the barrel, upon which a pawl acts, the liberation of the breaks being effected by disengaging this pawl from the ratchet wheel, when the weight of the chain will immediately cause the barrel to run backwards, slackening the chain and allowing the break levers to descend. That part of the arrangement which consists in passing the chain beneath pulleys carried by bars connected with the coupling bars of the carriages has the effect of preventing the carriages of a train from "crowding together" when the breaks are applied, the tension of the chain then tending to keep the carriages asunder. The details of the invention are minutely described, and include in particular the use of a certain slider and pin, or their equivalents, connected with a chain which is separate from the break chain and which is wound up at the same time and by the same motion as such break chain in order to bring into action the mechanism by which the motion of the barrel is arrested as above mentioned. These details, however, will only be clearly understood with the aid of the drawing annexed to the Specification.

[Printed, 8d. Drawing.]

A.D. 1855, February 28.—No 440.

**GEDGE, JOHN.**—(*A communication from Sophia Richter.*)—"Improvements in apparatus or machinery for stopping or retarding vehicles used on railways."

This invention consists essentially in a means of instantly separating railway trains into two or more parts on the approach of danger, thus affording, for example, the means of separating the passenger from the other vehicles of a train, or of separating the engine, in case of circumstances arising which might render separation desirable. The carriages are connected with the engine, for example, by a hook in front of the first carriage (to which other carriages may be attached in the ordinary manner).



which hook a chain passes to the engine, the hook of the carriage being so formed that the part upon which the chain acts is vertical while the connection exists, but the whole hook being mounted upon a pivot and capable of turning downwards so as to release the chain when requisite. While it is desirable to retain the connection between the engine and the train the hook is kept up, so as to be acted upon by the chain, by a horizontal lever furnished with a recess into which the vertical part of the hook enters, there being upon this part of the hook either a small cogged wheel fitting into teeth in the recess, or a roller working against the inside of the recess. With this lever, however, are connected certain arrangements of toothed wheels, racks, and other appendages which may be so acted upon through the medium of a handle that the recessed end of the lever may be disconnected from the hook, which then falls down and allows the chain to slip from it. The cogged wheel or roller on the end of the hook will cause less friction between the latter and the recessed part of the lever than would otherwise take place. This apparatus may be applied to either one or several of the carriages of a train, and such carriages may be provided with breaks in the ordinary manner.

[Printed, 8d. Drawing.]

A.D. 1855, March 1.—No 454. (\* \*)

MILLER, GEORGE MACKAY.—“Improvements in axles and “axle boxes of engines and carriages in use on railways.” These improvements on axles reduce the frictional surface of the journal by forming it with but one collar or shoulder at its inner or outer end, the lateral motion of the axle being prevented by the shoulder bearing against the step; or the journal may have no collar or shoulder to bear against the step, but its extremity may bear against the face plate of the axle box; in this case the journal extends beyond the step, and is gradually enlarged.

2. The axle boxes are formed that the main portion of them can be removed without lifting the carriage off the wheels, the lower part of the axle box (constructed in two parts) being made open at top to receive the bearing; and that part of the box which forms the hopper and the two parts of the axle box are kept in their position by bolts.

[Printed, 8d. Drawing.]

A.D. 1855, March 1.—N° 457.

JOHNSON, JOHN HENRY.—(*A communication.*)—(*Provisional protection only.*)—"Improvements in machinery or apparatus for rolling and shaping metals."

This invention relates to an improved arrangement of rolling mill, applicable to the manufacture of railway tyres, horse-shoes, and other curved articles, and it consists "in combining an ordinary plain roll, or it may be slightly modified in form, according to circumstances, with a block or plate running on a centre, and having a groove or slot formed in its surface, corresponding in curvation and shape to the article required. The grooved plate is rotated by a cylinder or roller underneath it, such roller having small notches or projections formed round its periphery, which take into corresponding notches in a projection on the under side of the revolving horizontal table. This driving roller is situated immediately below the pressing roller, and serves thereby as a support to that side of the table under pressure. Both the pressing and driving rollers are actuated by suitable gearing, which is so arranged as to cause them to rotate in opposite directions. The bar to be shaped whilst at a red heat, is fed gradually into the shaping groove, being drawn in as the table and pressing roller revolves. The groove having been filled, the bar is cut off from that portion in the groove or matrix by being pressed by the pressing roller against a fixed knife situated in the groove."

[Printed, 4d. No Drawings.]

A.D. 1855, March 8.—N° 516.

HAZELDINE, GEORGE.—"Improvements in wheel carriages, and in the wheels thereof."

According to one part of this invention a horizontal framing is used, which is distinct from the body of the vehicle, and which "rests upon the axles of the wheels without the intervention of springs, such axles being short axles, one for each wheel, and formed as a fixed centre that does not itself rotate, whilst the wheel turns upon it," bearings or journals for the axles to turn in or upon being thus dispensed with. "The body of the vehicle, which is encompassed (or it may be nearly encompassed only) by the said framing, and rests upon or is suspended from it by means of half springs, can thus be brought much lower and nearer the ground than is generally done without the use of

which hook a chain passes to the engine, the hook of the carriage being so formed that the part upon which the chain acts is vertical while the connection exists, but the whole hook being mounted upon a pivot and capable of turning downwards so as to release the chain when requisite. While it is desirable to retain the connection between the engine and the train the hook is kept up, so as to be acted upon by the chain, by a horizontal lever furnished with a recess into which the vertical part of the hook enters, there being upon this part of the hook either a small cogged wheel fitting into teeth in the recess, or a roller working against the inside of the recess. With this lever, however, are connected certain arrangements of toothed wheels, racks, and other appendages which may be so acted upon through the medium of a handle that the recessed end of the lever may be disconnected from the hook, which then falls down and allows the chain to slip from it. The cogged wheel or roller on the end of the hook will cause less friction between the latter and the recessed part of the lever than would otherwise take place. This apparatus may be applied to either one or several of the carriages of a train, and such carriages may be provided with breaks in the ordinary manner.

[Printed, 8d. Drawing.]

A.D. 1855, March 1.—N° 454. (\* \*)

MILLER, GEORGE MACKAY.—“Improvements in axles and “axle boxes of engines and carriages in use on railways.” These improvements on axles reduce the frictional surface of the journal by forming it with but one collar or shoulder at its inner or outer end, the lateral motion of the axle being prevented by the shoulder bearing against the step; or the journal may have no collar or shoulder to bear against the step, but its extremity may bear against the face plate of the axle box; in this case the journal extends beyond the step, and is gradually enlarged.

2. The axle boxes are formed that the main portion of them can be removed without lifting the carriage off the wheels, the lower part of the axle box (constructed in two parts) being made open at top to receive the bearing; and that part of the box which forms the hopper and the two parts of the axle box are kept in their position by bolts.

[Printed, 8d. Drawing.]

A.D. 1855, March 1.—N° 457.

JOHNSON, JOHN HENRY.—(*A communication.*)—(*Provisional protection only.*)—"Improvements in machinery or apparatus for rolling and shaping metals."

This invention relates to an improved arrangement of rolling mill, applicable to the manufacture of railway tyres, horse-shoes, and other curved articles, and it consists "in combining an ordinary plain roll, or it may be slightly modified in form, according to circumstances, with a block or plate running on a centre, and having a groove or slot formed in its surface, corresponding in curvation and shape to the article required. The grooved plate is rotated by a cylinder or roller underneath it, such roller having small notches or projections formed round its periphery, which take into corresponding notches in a projection on the under side of the revolving horizontal table. This driving roller is situated immediately below the pressing roller, and serves thereby as a support to that side of the table under pressure. Both the pressing and driving rollers are actuated by suitable gearing, which is so arranged as to cause them to rotate in opposite directions. The bar to be shaped whilst at a red heat, is fed gradually into the shaping groove, being drawn in as the table and pressing roller revolves. The groove having been filled, the bar is cut off from that portion in the groove or matrix by being pressed by the pressing roller against a fixed knife situated in the groove."

[Printed, 4d. No Drawings.]

A.D. 1855, March 8.—N° 516.

HAZELDINE, GEORGE.—"Improvements in wheel carriages, and in the wheels thereof."

According to one part of this invention a horizontal framing is used, which is distinct from the body of the vehicle, and which rests upon the axles of the wheels without the intervention of springs, such axles being short axles, one for each wheel, and formed as a fixed centre that does not itself rotate, whilst the wheel turns upon it, bearings or journals for the axles to turn in or upon being thus dispensed with. "The body of the vehicle, which is encompassed (or it may be nearly encompassed only) by the said framing, and rests upon or is suspended from it by means of half springs, can thus be brought much lower and nearer the ground than is generally done without the use of

" cranked axles, which are subject to such considerable vibration  
" and great weight, with consequent augmentation of the chances  
" of breakage." Ambulance or hospital carriages for soldiers,  
to which the invention is especially applicable, are formed as  
mentioned above, but fitted in the interior with moveable bed-  
steads and other conveniences; and in order to enable such and  
other carriages to travel with facility on soft ground the wheels  
thereof are furnished " with additional removeable tyres, broader  
" than the felloes of such wheels, said tyres being made in parts  
" somewhat similar to the felloes, and bolted on or securely  
" attached thereto, and, if need be, easily and readily detachable  
" therefrom."

The invention is described more particularly with reference to  
the construction of a cart with two wheels and adapted for being  
drawn by horses, the framing being so constructed that the short  
axles are each supported at both ends, the wheels turning loosely  
upon them, and half springs being connected at one end to the  
under side of the framing and at the other end with certain  
upright rods and cross irons, with which the body of the cart is  
connected by means of straps, guiding or steadying irons, and  
additional springs of vulcanized india-rubber which come into  
action when the half springs are subjected to a severe strain, also  
forming part of the arrangement. The cart is provided with  
shafts arranged for two horses to work abreast, such shafts being  
run into sockets in the framing, and secured there by a bolt.  
When applied to the purposes of an ambulance, the interior of  
the cart is fitted with beds or cushions, which are connected to  
the sides of the vehicle by hinges, so as to be turned up out of  
the way when necessary, a seat for an attendant being arranged  
inside the vehicle, and a "doctor's store box and a cistern" being  
placed on the top. A door is arranged in the back of the vehicle  
which is hung on long pins so contrived that the door may be  
raised and opened although the weight in the vehicle may have  
depressed the door below the bottom framing.

These arrangements may be varied, and may be applied to car-  
riages for railways, as well as to vehicles for common roads.

[Printed, 10d. Drawing.]

A.D. 1855, March 8.—N<sup>o</sup> 517.

KRUPP, ALFRED.—"Certain improvements in the construction  
" of railway wheels."

According to this invention a wheel is composed of "two distinct and separate parts, namely, first, the interior of the wheel, including the nave; and, second, the tyre. These parts are united by bolts and nuts, or by the ordinary process of shrinking." The nave and interior part of the wheel are of solid cast iron, the central portion of the wheel, surrounding the nave, having radial corrugations which diminish in depth towards the rim. "This rim is furnished on each side with a flange, the inner one being of a greater depth than the outer, in order to receive the bolts necessary to secure it to the tyre; or the central portion of the wheel may be cast with a number of radial ribs, of a greater width at the nave and diminishing towards the outer edge; in all cases the central portion should be cast of sufficient dimensions to allow of being turned in the lathe, to form smooth and even surfaces at the periphery and at the nave for securely fixing the tyre and axle. For locomotive wheels, the radial corrugations or ribs should be increased proportionably in number and depth to the size of the wheel. The tyres for these wheels may be of wrought iron or of wrought or rolled steel, and attached to the rims or flanges of the central and solid portion of the wheel, either in a hot state by shrinking, or in a cold state by means of a hydraulic press, or by bolts and nuts, or by any other approved method." The patentee mentions that according to this invention "the whole of the tyre is equally supported," leading to less wear of the same, other advantages arising from the invention being also set forth.

[Printed, 4d. No Drawings.]

A.D. 1855, March 15.—N° 586.

LORET-VERMEERSCH, FRANÇOIS. — (*Provisional protection only.*)—"Stopping trains on railroads."

This invention consists "in the employment of a break or breaks worked by a piston in a steam cylinder, for the purpose of stopping or checking the speed of locomotive engines, and in causing breaks to act upon the wheels by the play of the buffers," the rods of which "being thrust inwards beyond a given point, act upon certain levers, cranks, and rods, and force the break blocks against the wheels."

[Printed, 4d. No Drawings.]



A.D. 1855, March 19.—N° 615.

**SMALLEY, JOHN.**—"Improvements in railway carriage axles."

According to this invention the axles of railway carriages are "formed of separate parts which fit and turn within or upon each other or within or upon a sleeping axle." The said parts, and sleeping axle (when the latter is used), "are made hollow and solid respectively, or partially hollow and partially solid," but in all cases those parts of the axle which carry and turn with the wheels "are solid through the boss or nave of the wheel, the hollow parts occurring only between the wheels." When the axle is made in two parts (the form which the patentee states that he prefers) "one is made hollow from nave to nave, or nearly so, and the other solid throughout," but in no case does either the hollow or the solid part of the axle which carries one wheel pass through the opposite wheel, but terminates at the nave thereof, for the purpose of "keeping the wheels in proper guage." The end of the hollow axle is furnished with a flange, which fits into a cap bolted to the back of the nave of the wheel carried by the solid axle, the parts being thus prevented from separating. When the axle is in more than two parts the third part consists of a sleeping axle, which according to one arrangement is a short solid axle inserted into hollow portions of each of the other two, the latter meeting midway below the carriage and having flanges at the ends around which loose caps are placed, the caps being bolted together and serving to keep the parts in their proper relative positions.

In another arrangement each wheel is placed upon a solid half axle, and these half axles are inserted into a hollow sleeping axle, the latter having collars or flanges at the ends which are surrounded by caps bolted to the wheels.

The object of all these arrangements is to enable the two wheels to rotate at different velocities when they are passing round curves in the lines of rails. Suitable provision is made in each case for lubricating the parts.

[Printed, 10d. Drawing.]

A.D. 1855, March 22.—N° 636.

**SEMPLE, MATTHEW.**—"Improvements in railway breaks."

This invention consists in applying a continuous or friction band round a projection formed at the back or inside on one or

each of the wheels of a railway carriage, "or on a ring or boss, "or on rings or bosses fixed on the axles of the wheels, and in "tightening the said bands by means of right and left-handed "screws which form part of or are connected with a system of "rods extending the whole or any required portion of the length "of the train, and furnished with gearing by which the breaks- "man may work them." These breaks may be applied to as many carriages of a train as may seem desirable, and the rods of the several carriages being connected by sliding or by universal socket joints the whole of the breaks may be brought into action simultaneously. "The rods which work the screws may be supported entirely by the axle, or in such other ways as to be quite "independent of the carriage, but fixed so as to accommodate "themselves always to the position of the wheels in their rise "and fall occasioned by the wear of the axle boxes." The patentee states that by these arrangements the motion of a train may be checked or stopped "without causing the carriage wheels "to slide upon the rails and thus produce flat places on their "peripheries, an evil common to nearly all, if not to the whole, "of the existing railway breaks."

[Printed, 10d. Drawing.]

A.D. 1855, March 24.—No 653.

CLEWE, T. F. E.—"A new construction of locomotive engines, "tenders, and railway carriages."

This invention relates in the first place to a peculiar construction of the framing of tenders and railway carriages, and also to a peculiar arrangement of the running wheels of locomotive engines, tenders, and carriages, "whereby the present axles are "entirely dispensed with, and the wheels have each a separate "and distinct movement of their own;" the invention relating, secondly, to "a peculiar arrangement of caoutchouc or other "elastic springs, to be used in lieu of the present metal or steel "bearing springs of railway rolling stock."

The improvements in the construction of the framing consists "in making each side of the frame double, that is, composed of "two longitudinal beams, placed a sufficient distance apart to "receive between them the running wheels of the vehicle. A "wrought iron plate is bolted on to each side of the beams, and "these plates are securely tied together by transverse bolts.

" The plates thus secured project downwards below the carriage framing a sufficient distance to contain the bearings of the axles of the running wheels. Each and every wheel of the carriage or truck is keyed or otherwise fastened on to a short axis of its own, which axis runs in bearings carried inside or between each pair of wrought iron plates" already mentioned; the wheels thus rotating independently of each other. "The correct gauge of the wheels is maintained by interposing between the longitudinal beams, at the part where the ordinary axle would be, a tight but strong wrought iron diagonal or other framing, which is bolted to the insides of the main frame of the carriage or other vehicle. The carriage framing is also still further secured and bolted together by horizontal or diagonal tie-bars or rods, attached to the four corners of the main framing."

That part of the invention which relates to springs consists in the employment of blocks of caoutchouc or other elastic material, placed over the bearings and inside the space between the wrought iron plates mentioned above. A short rod passes upwards from the bearing through each spring, and works at its upper end in a guide hole formed in the carriage framing, these rods keeping the springs in their proper places. "By this arrangement the spring boxes are entirely dispensed with, the guard or horn plates forming the cavity for the springs, which are thus completely concealed."

[Printed, 10d. Drawing.]

A.D. 1855, March 29.—N° 693.

MOWBRAY, FREDERICK WILLIAM. — "Improvements in bearings for the axles of railway wheels and of other axles or shafts, which improvements are also applicable to axles or shafts and other like rubbing surfaces."

This invention consists "in forming the bearings for axles of railway wheels, and of other axles or shafts, with the rubbing surface grooved or recessed in an oblique direction to the axles or shafts working in them, for the purpose of more uniformly distributing the oil or other lubricating matter, and thus keeping the parts cool."

Different modifications of the invention are described, two of which are specially set forth as suitable for railway axles.

[Printed, 8d. Drawing.]

A.D. 1855, March 29.—N° 694.

GEDGE, JOHN.—(*A communication from Frans Steigerwald, Henrich Schirges, and Carl Fuchs.*)—"Improvements in the means of stopping or retarding railway trains."

According to this invention the breaks are placed in connection with the buffers of a railway train, and are acted upon by the latter through the medium of "flaps," which can be raised by means of a cord when it is desired to back the train without the breaks being made to operate. The break blocks are suspended by chains from the buffer rods, and also connected therewith by an arrangement of levers and rods, the effect of the whole being that on a tendency arising in any of the carriages to overrun the locomotive power, or on such tendency being purposely created by slackening the speed of the engine, the buffers, having their rods thrust inwards, lower the break blocks so as to cause them to press upon the rails, and at the same time draw them tightly against the wheels, this action only continuing, however, so long as the buffers are in action, the buffer springs, on their release, restoring all the parts to their first position. One cord may be made to serve for raising the flaps of all the carriages of a train, such cord being coiled upon a suitable roller, and the flaps of the different carriages connected therewith by hooks.

[Printed, 10d. Drawing.]

A.D. 1855, March 31.—N° 718.

WHITLEY, CHARLES.—"Improvements in machinery or apparatus for drilling."

This invention relates to "arranging a series of drill or cutter holders, so that they may have a simultaneous motion given to them, to cause the drills or cutters carried thereby to move and cut in directions towards or from a common centre, or to or from lines crossing each other, in order to their being capable to drill two or more holes, simultaneously or separately, in different parts of a cylindrical surface or a several sided figure."

"A central toothed wheel takes into and drives pinions upon axes, each of which by a bevelled pinion gives rotatory motion to a cutter holder. Upon each of these axes is also affixed an eccentric, which by a connecting rod, actuates a ratchet or driver to take into a suitable ratchet wheel, and give the desired feed

"motion to each cutter." These details may, however, be varied.

The patentee mentions that the advantages of this invention consist in being enabled to drill a railway carriage tyre, or tyre and wheel together, on the axle, or separately, as the case may be, in a horizontal position, with the assistance of a crane appliance for lifting the axle and wheels in and out of position, "and more particularly when re-tyring wheels, as the drills or cutters are sure to meet the old holes in the wheels, without the necessity of taking the wheels from the axles."

The details of the invention are minutely set forth.

[Printed, 10d. Drawing.]

A.D. 1855, April 19.—N<sup>o</sup> 876.

JOHNSON, JOHN HENRY.—(*A communication.*)—(*Provisional protection only.*)—"Improvements in railway brakes."

This invention relates to so arranging railway brakes that "the whole of the wheels of the carriage are raised from off the rail simultaneously when the brakes are brought into action. The first and last axle of each carriage is acted upon by a pair of brakes, and these brakes consist each of a cast-iron box fitted to slide along a rack, which is jointed at its upper end to a fixed eye secured to the cross beams of the carriage framing. Inside each box is fitted a toothed pinion gearing with the racks, these pinions serving to lengthen the brake, and so bring its foot in contact with the rail when the carriage is to be stopped. The pinion is actuated by a second pinion fitted on to the same spindle, which second pinion is placed outside the cast-iron box, and is actuated by means of a segment wheel or pinion which gears into it. On the axis of this segment wheel is fitted a lever arm, to the free end of which is attached a cord or chain, which is connected to a pair of blocks or hauling tackle," the cord of which passes to a drum on the top of the carriage, there being a separate cord and drum to each brake, the drums being placed on vertical spindles, which can be actuated simultaneously by an endless chain and pinions and a winch. "A projection or horn is formed on the side of each box next the axles, and when the brakes are to be brought into action the feet of the brakes are brought in contact with the rails by actuating the racks and pinions, and the projections are pushed

"under the axles by the impulse of the carriage," raising the latter "bodily from off the rails;" the apparatus being prevented from returning to its first position until required by means of a ratchet wheel and a detent, which, however, can be released when necessary. The drums of all the carriages of a train may be acted upon simultaneously by the employment of suitable endless chains, but the arrangement should be such that the brakes of the hinder carriages may be brought into action rather sooner than the others, in order to prevent the shocks which would otherwise occur from the tendency of the hinder carriages to overrun those in front of them.

[Printed, 4d. No Drawings.]

A.D. 1855, April 25.—N<sup>o</sup> 921.

AVISSE, LOUIS ALEXANDRE.—"Improvements in lubricating "revolving shafts of all descriptions, and also the axles of railway "and other wheels."

One of the main features of this invention consists in causing the lower part of the running surface of the axle (or shaft) to be "constantly immersed" in oil. An arrangement is described in which a railway axle has the journal grooved, such journal having upon it an upper bearing of the ordinary shape, but of cast iron instead of brass, the lower part of the axle box forming a reservoir, into which oil is introduced through a glass tube, this serving not only as a passage for such oil, but also as a means of ascertaining the quantity of oil in the reservoir, the axle being furnished with a projecting ring in some cases, which works in a recess in the bearing, and prevents the axle from "wabbling." In the upper part of the axle box is a recess which is filled with water, this serving to keep the parts cool, but this recess has no communication with the lower reservoir containing the oil. Various applications of the invention are described, some being adapted to upright shafts, and one of these being applicable to the spindles of spinning machines, the details of the invention including the use of a "bearing die," having small projecting edges on each side, which, bearing against the internal sides of the oil chamber, leave narrow spaces through which oil which has been carried up by the axle from the reservoir can return to the latter.

[Printed, 1s. 4d. Drawings.]



A.D. 1855, April 25.—N° 926.

**BLACK, JOHN.**—"Improvements in axles, shafts, and bearings."

The main object of this invention is the efficient lubrication of the axles of railway engines, tenders, and carriages, the invention being also applicable to carriages for common roads, and to shafting in general.

The invention consists, firstly, in providing an axle (or shaft) with a bearing, which is recessed in the centre for the reception of a lubricating collar or ring, which is fitted to or cast upon the axle or shaft, the recess forming a central reservoir for oil or other lubricating material, which is taken up by the ring or collar as the axle or shaft revolves, and distributed over both that and the bearing. The central reservoir communicates with other reservoirs formed in the bearing, and into which lubricating material is introduced by means of suitable passages. The lubricator on the axle may be either rectangular, round, or of any other convenient shape, and the patentee states that the axle will be strengthened by the application of such lubricator. This part of the invention appears to relate more particularly to axles or shafts, working in what the patentee terms "fixed endless rail bearings," by which he apparently means bearings made in the form of rings, surrounding the axle or shaft.

Another part of the invention consists in "fitting a pair of revolving endless rail bearings, collars, or rings, at each end of the nave or stock of a carriage or other wheel, which revolving endless rails form bearings for the axle, and prevent it from touching the inside of the nave or stock, the space inside the nave, around the axle, between the rings or revolving endless rails forming a chamber for the reception of oil or other lubricating material; the inner portion of the revolving endless rails, or rings, or collars, fitted at each end of the nave or stock, may be constructed straight, round, rectangular, or of any other convenient shape," this arrangement being "particularly adapted for axles not intended to revolve." A shaft or axle may, however, be provided with both these arrangements, "employing the second arrangement at the part where the axle passes through the nave or stock of a wheel, and the first arrangement at any other part or parts of the axle, applicable to spring or carriage bed;" or both arrangements may be com-

bined "in the nave or stock of the wheel," that is to say, rings, collars, or revolving endless rail bearings may be provided at each end of the nave, to serve as bearings for the shaft or axle to rest upon, instead of the ordinary box; such shaft or axle being furnished with a lubricating ring or collar, which revolves in a reservoir made to receive it in the centre of the fixed endless rail bearings, which may be fitted either to the spring or carriage bed.

Various modifications of the invention are described, including the application to the axle of a railway engine, tender, or carriage of both parts of the invention combined.

[Printed, &c. Drawing.]

A.D. 1855, April 25.—N° 936.

DRAPER, SAMUEL.—"Improvements in apparatus for retarding and stopping railway trains."

This invention consists in "employing fluid to uphold railway carriages when in motion, in such manner that, on any requirement for the use of the breaks or apparatus for offering friction to the wheels or to the surface of the rails" to retard or stop a train composed of such carriages, they will be "called into action" on the fluid being allowed to flow out of the vessels containing it, by reason of the weight of each of the carriages pressing on the breaks or apparatus used for offering friction. For this purpose cylinders or vessels, each having a ram therein, are applied to each carriage. The several rams are applied to uphold the body of the carriage, and the cylinders or vessels to contain the fluid are applied to the framing of the carriage. Water (by preference) is forced into the vessels, which, acting on the rams, will uphold the body of the carriage till the fluid is allowed to flow out of the vessels, when by the descent of the body of the carriage the weight thereof will immediately press on and move the breaks or apparatus used to retard the carriage, and cause them to act instantaneously, and by having two sets of cylinders or vessels with their rams, the breaks or apparatus may be as instantaneously relieved."

The details of the invention may be varied, but an arrangement is described in which the frame of the carriage is provided with small wheels or rollers, below which another frame is capable of moving to and fro, being provided, moreover, with inclined planes, which, when the frame is thrust in one direction by means

of a hydraulic ram and cylinder arranged for the purpose, come in contact with other rollers which cause large break blocks to be lowered down upon the rails, the pressure of the carriage being then brought to bear upon them (through the medium of the sliding frame) by the discharge of water from other cylinders containing rams which at other times support the body of the carriage so as to keep it free from the breaks, the latter being again relieved from pressure upon the rails when requisite by withdrawing the frame with the inclines, so as to place the latter out of contact with the break rollers, the breaks being then lifted out of contact with the rails by counterweights or springs. Water is forced into the cylinders of the rams which sustain the carriage when the latter is again put in motion by a pump worked by a cam attached to one of the wheels, this water being supplied from a reservoir mounted below the carriage, while that for actuating the moving frame is supplied by the force pump of the engine, as well as that for working another ram which actuates the mechanism by which the water is discharged from the cylinders containing the rams which sustain the carriage. Suitable arrangements of pipes and other apparatus convey water to the different rams, and the arrangements may be such as to apply breaks to the wheels instead of to the rails.

[Printed, 1s. 6d. Drawings.]

A.D. 1855, May 1.—N° 973.

EASSIE, WILLIAM.—“Improvements in machinery or apparatus for stopping or retarding railway trains.”

In this invention break blocks are suspended at each side of each wheel on one side of a railway carriage, the blocks in front of the wheels being connected to one longitudinal rod jointed thereto, while those at the back of the wheels are jointed to a second similar rod, so that by pulling these rods in opposite directions all the breaks are pressed simultaneously against the wheels. This movement of the rods is effected by means of a tube, which serves as a shaft, and which is mounted longitudinally below the body of the carriage, there being on this tube, near each end of the carriage, a worm capable of acting upon a worm wheel fixed upon a cross shaft carrying a lever or arm jointed to one of the longitudinal rods, the thread of one worm being cut in the contrary direction to that of the other, and the result being that

on the tubular shaft being caused to rotate in one direction, the rods are moved in opposite directions, so as to apply the breaks, while on turning the shaft in the other direction the breaks are withdrawn from the wheels. The tubular shaft of one carriage is connected with those of the carriages before and behind it by means of square bars, which enter the end portions of the tubes, these being squared internally to receive them, and the bars are so jointed together with the aid of bolts, as to allow for both lateral and vertical motion of the respective carriages, chains connected to the tubes and also to the bolts preventing the latter from being withdrawn from the tubes, and one of the bolts being provided with a finger spring, by pressing upon which the bolt can be withdrawn, and one carriage disconnected from another.

[Printed, 10d. Drawing.]

A.D. 1855, May 1.—N° 977.

FISHER, GEORGE.—(*Provisional protection only.*)—"An improved buffer for railway carriages."

This invention "consists of two rectangular metal frames, made to slide one over the other." One of these frames is fixed to the "sole" of the carriage, and the other to the buffer head, cork shavings or other elastic materials being interposed between the two frames. "The frames are held together by a bolt which passes through them, and the play of the buffer is provided for by slots cut in two sides of one of the rectangular frames. The distance to which the slots can move is governed by the ends of the bolt. The larger frame is free to slide over the smaller, and after pressure has compressed the buffer," the elasticity of the cork shavings or other elastic material "restores it to its original position on pressure being removed."

[Printed, 4d. No Drawings.]

\* A.D. 1855, May 7.—N° 1010.

PEARSON, JAMES.—"Improvements in the method of fastening tyres on wheels."

In one mode of carrying out this invention the wheel rim is provided with a projection on one side, and the tyre has on the corresponding side an internal flange, which is grooved so as to fit upon such projection, and having been brought upon the rim in a heated state a projecting rib thereon is hammered down so as

to overlap the contrary side of the rim. In this arrangement the width of the tyre is somewhat reduced at the part which fits upon the rim, but in another arrangement which is described this reduction is not made, the edge of the wheel rim which is overlapped by the tyre being moreover "slightly tapered towards the centre of the wheel," so as to partake of the dovetail form. In a third arrangement both sides of the wheel rim are tapered or dovetailed, the internal flange of the tyre being recessed so as to correspond with one side, and the tyre being beaten down over the other, as before, and somewhat reduced in width, as in the first case, but not to the same extent. Three other arrangements are described, the first of which resembles the first of those already mentioned, with the exception of a flat ring entering a recess in the tyre in place of the latter being made to overlap the rim by hammering. In the second one part of the tyre is hammered into a recess in a similar ring, while in a third the rim has a grooved "externally projecting part," with which one side of the tyre is made to correspond, a ring placed on the other side of the tyre entering a recess or groove in the rim itself. The patentee states, however, that he only claims the three arrangements first set forth.

[Printed, 6d. Drawing.]

A. D. 1855, May 10.—N° 1055.

EASTWOOD, EDWARD.—(*Provisional protection only.*)—"Improvements in certain parts of railway carriages."

This invention relates to the axle boxes, buffer, and draw springs, and breaks of railway carriages, and, as regards axle boxes, consists in making such boxes "perfectly free from the bearing springs," such springs being secured to a saddle or chair which rests in a recess formed in the top of the axle box, this chair not being attached to the box but permitting it to have "a slight lateral play underneath" when the wheels are passing round curves. The axle box is, moreover, perfectly detached from the guard irons, the saddle to which the springs are attached working "vertically only between the guards, a groove being formed on each side of it for that purpose." The object of this invention is to allow the wheels and axles to adapt themselves to the passage of curves in the rails, and reduce the wear and tear of the flanges and tyres produced by their friction against the rails when no provision of this kind is made.

As regards buffer and draw springs the invention consists of a mode of arranging and working the ordinary C springs, whereby their weight and cost are reduced; and breakage of the spring plates avoided. The springs, which are not more than half the length of the ordinary C springs, are fitted between suitable guide stays, within which a block of wood or other substance may be inserted to keep the springs at the requisite distance apart. The ends of the springs, in place of bearing against the ends of the buffer rods, and consequently having the same stroke as those rods, bear against shoes rivetted to two horizontal lever bars, which have their fulcra in the central socket of the framing, whilst their free ends bear against the ordinary shoes on the ends of the buffer bars, the stroke of the springs thus being not more than one half of that of the buffers, and their combination with the levers causing them to "offer still greater resistance the more they are acted upon." The draw bars are attached in the ordinary manner to the centres of the buffer springs, and this arrangement of buffer and draw springs may be applied to other parts of the framework, as will be found requisite, in adapting them to self-discharging waggons.

That part of the invention which relates to breaks "consists of a set of break blocks, attached to the ends of strong springs, which are themselves secured in any convenient manner to the carriage framing. These breaks are held out of contact with the wheels by connecting rods, attached to short lever arms on a transverse rocking shaft, which works in brackets bolted to the framework. This shaft carries also a lever, to the free end of which is attached a vertical rod, which passes up through the carriage and out at the roof," the upper end of this rod having upon it a catch or projection, which is hooked over one end of a horizontal lever working on a fixed centre on the carriage, this lever having connected thereto a cord which passes over all the carriages composing a train. On pulling at this cord in either direction the lever is so moved as to release the vertical rod, and this is instantly drawn down by the action of the break springs, which now press the breaks against the wheels of the carriage, the apparatus being re-adjusted, when necessary, by means of a chain connected to the vertical rod and passing round a small pulley, which being turned by a handle causes the chain to raise the rod and permit the horizontal lever to be again brought under the catch.

[Printed, &c. No Drawings.]



A.D. 1855, May 10.—N° 1057.

HARRIS, JOHN, and SUMMERSON, THOMAS.—“An improvement in the manufacture of iron railway wheels.”

This invention relates to the construction of cast-iron wheels which shall be stronger than those ordinarily formed, and consists of employing a ring of wrought angle-iron, which is placed in the mould and receives the casting of iron thereon, the angle-iron, however, not being so wide as the intended flanged ring or felloe of the cast wheel. “There are as many holes formed horizontally through the wrought angle-iron as there are to be spokes to the cast wheel. The wrought angle-iron is placed in the mould, the cast iron is then run into the mould, and the cast wheel is formed on the wrought angle-iron, which is at the inner surface of the cast ring or felloe, and partly enclosed therein.”

[Printed, 6d. Drawing.]

A.D. 1855, May 16.—N° 1112.

RYE, WHARTON.—“An improved railway wheel, which may also be employed for other similar purposes.”

This wheel is “composed of two or more wrought-iron plates, a circular piece being taken out of the centre, and their sides hollowed or dished out from their periphery towards the centre, their convex surfaces being placed together, or, as it were, opposed to each other back to back, and then the rim of the wheel and the boss or nave of the wheel cast upon or around the wrought-iron plates, thus combining the whole together, the rim being ‘chilled’ in the casting, and the nave merely requiring boring out and finishing.”

A mode of carrying out the invention is described in which eight segmental plates are used, which are placed in two series, so as to break joint, holes being punched or bored in all the plates, both in that portion which is to enter the rim and in that which is to enter the nave. The plates being placed together in order the rim is first cast thereon, the outer parts of the plates thus becoming embedded therein, and portions of the metal passing into and filling up the holes, thus firmly securing the rim and plates together, and the nave being then cast thereon and secured by the metal filling the perforations in those parts of the plates which are enclosed in it, the nave being then bored out and finished

as usual. The rim is cast with a flange, a separate tyre being thus not required.

[Printed, 8d. Drawing.]

A.D. 1855, May 26.—N° 1192.

LÓRÁND, JOHN LEUTHNER.—(*Provisional protection only.*)—  
“An improved railway break.”

This invention consists in the employment of a cylinder in which a piston is made to work, the cylinder being provided with suitable valves, and this apparatus acting, in fact, as an air pump, being worked from one of the axles of a railway carriage, and being made, when it is desirable, to restrain or stop the movement of such carriage, to condense air into a chamber communicating with the cylinder, the resistance offered by the air to such condensation serving the purpose of a break. The details of the invention may be varied. The piston may be connected with a crank and gearing driven from one of the axles of the carriage, and a clutch be provided by which the piston may be brought into action when necessary; or the motion of the piston may be continuous, and valves be contrived so as to allow the air to escape when condensation is not required; or the cylinder may be double-acting, and waste steam be admitted thereto from the engine instead of air, and other methods be devised for giving motion to the piston.

[Printed, 4d. No Drawings.]

A.D. 1855, May 29.—N° 1227.

CLOWES, ELLIS.—(*A communication.*)—(*Provisional protection only.*)—“An improved construction of spring for resisting sudden  
“and continuous pressure.”

Before describing this invention the inventor states that buffer, draw, and bearing springs, as usually constructed, are so arranged that when any of the plates composing the spring is broken the spring box has to be removed from the carriage to which it has been applied in order to permit of the spring being restored or repaired, this removal causing an objectionable expenditure of both time and money. He then states that the object of this invention is to prevent these inconveniences by the employment of a spring which is composed of several plates of steel, “bent to the form of  
“a bow, and placed together loosely in pairs, their ends being  
“confined in suitable guides, which sufficiently expose the spring

" to permit of any broken or defective plates being replaced by  
 " other plates without it being requisite to remove the whole spring  
 " from the carriage. In this construction of spring several plates  
 " might be broken without interfering with the working of the  
 " carriage. The curved steel plates are tapered at each end from  
 " the centre, and are formed with a small portion of their ex-  
 " tremities flat at their points of junction. About ten minutes  
 " will suffice for repairing this spring, even should several plates  
 " get out of order or be broken, and the reparation can be effected  
 " without removing the carriage from the line of rails."

" By the use of the improved spring (which the inventor terms  
 " the variable flexion spring) long buffer rods will not be required,  
 " supposing a maximum length of about nine inches to be adopted  
 " as the stroke of the buffer. This may be limited by bolting the  
 " hinder part of the spring box to the framing in such a manner  
 " as to bear against the first intermediate traverse, so as to  
 " diminish the number of spring plates required, which shall be  
 " determined by the length of stroke required for the buffer  
 " rod."

[Printed, &c. No Drawings.]

A.D. 1855, May 29.—N<sup>o</sup> 1232. (\* \*)

JOHNSON, JOHN HENRY.—(*A communication from Jackson Brothers, Petin, Gaudet, and Company.*)—(*Provisional protection only.*)—"Improvements in casting metals."

The Provisional Specification relates to a mode of casting circular articles, as wheel tyres, hoops, &c. A circular chill or mould is made to rotate at a great velocity, and so form the interior shape of the article to be cast. The molten metal is poured into or near the centre of the rotating chill, and is driven by centrifugal force to the circumference, where it is allowed to cool. The top face or plate of the mould or chill is then removed, and the casting is withdrawn.

[Printed, &c. No Drawings.]

A.D. 1855, June 1.—N<sup>o</sup> 1255.

PELLENZ, JOHN CHARLES.—"Improvements in the manufacture of iron wheels."

Before describing this invention the patentee mentions that  
 " the tyre of a railway wheel, if constructed with spokes, is  
 " unequally and insufficiently supported at that part which is

"between the spokes," and that in order to remedy this defect it has been usual to employ, instead of spokes, circular discs of wood or metal, this substitution, however, being attended with disadvantages which it is the purpose of this invention to obviate.

According to this arrangement a disc is used, which is composed of iron plate about three-eighths of an inch thick, the disc having at one or both of its outer edges a flange of about seven-eighths of an inch thick, to which the tyre may be attached by screws or bolts, such flange or flanges constituting the rim of the wheel, and "being of "one piece with the disc," and the operation of forming the disc from an iron plate being effected by means of mechanism which not only bends the outer edge of the plate so as to form a rim, but also produces corrugations in the disc, the arrangement being such that "the greater part of the surface of "the disc will diverge on both sides towards the axis of the "wheel, and therefore not only afford considerable lateral stability "to the wheel, but also great strength and surface to unite with "the nave. The plate can be made very thin, as its substance is "thus distributed that every concentric section offers the same "surface, even if deemed desirable to be rolled thicker towards "the inner edge," and a wheel thus constructed combining "the "advantage of both the disc and spoke system" without the disadvantages of either. "The number of projecting parts of the "disc which may be considered to represent the spokes is quite "arbitrary, but it is necessary to observe that by increasing their "number the lateral divergence towards the nave will be lessened, "and hereby, also, the stability of the wheel."

The plate from which a disc is to be formed should be composed of pieces rolled together, such pieces being "piled up in "the cross way," this rendering the plate less liable to break when subjected to the operation of bending. This operation is effected by the use of pattern blocks, pattern segments, and other suitable apparatus, all of which are fully described, but the arrangement of which will not be understood without an inspection of the drawings annexed to the Specification. If desired, the flange of the wheel may be made so as to serve both as rim and tyre, rendering the application of a separate tyre unnecessary.

[Printed, 1s. Drawings.]

A.D. 1855, June 4.—N° 1269.

INGALL, GEORGE HENRY.—(*Provisional protection only.*)—  
"Improvements in coupling railway carriages."

According to this invention each end of each carriage frame is provided with two hooks, and one end of a chain being passed upon one of these hooks is then carried round a guide pulley behind it, thence to the end of the next carriage, round a guide pulley there, and across to and round another pulley in line therewith, thence back to the first carriage, round another guide pulley there, and onwards to the other hook of the first carriage. A second chain is then passed upon one of the hooks of the second carriage, and proceeds in the same way around pulleys arranged in inverse order to those mentioned above, and back to the other hook of this carriage; the two carriages being thus coupled by the chains, although the usual coupling link is also employed, with ball and socket joints at the ends, the construction of the link, as well as the arrangement of the chains and pulleys, facilitating the passage of the carriages round curves in the rails. Any number of carriages may of course be thus connected.

[Printed, 6d. Drawing.]

A.D. 1855, June 11.—N° 1325.

HALL, WILLIAM KEMBLE.—“Improvements in breaks for railway carriages.”

After making some observations upon the disadvantages of the arrangements for working railway breaks hitherto adopted, the patentee proceeds to describe this invention as consisting in the first place in connecting the break blocks and the levers by which they are pressed against the wheels to swinging frames, one frame supporting the blocks and levers of each pair of wheels, and each frame being mounted on pivots or an axis below the carriage frame, but above the axles, and the axis of the frame being nearer to one end of the latter than to the other, causing one end of the frame to preponderate over the other. One lever connected with each set of breaks and their supporting frame extends upwards from the shorter end of the latter, the preponderance of the other end keeping this lever in contact with a stop on the draw bar, the effect being that when the carriage is being dragged onwards by that bar, the breaks are prevented from acting; but upon the velocity of the train being reduced by the motion of the engine (for example) being slackened, the impetus of the carriage runs it forward on the draw bar, and the stop then allows the break levers to press the break blocks against the wheels, from which they are

again released when the carriage is again dragged forward by the draw bar. When it is desired to back the train, the breaks are of course again allowed to press against the wheels, but now the reverse movement of the latter causes the blocks to so act upon the swinging frame that it turns upon its axis in such manner as to release the breaks from the wheels. Instead of the swinging frame being hung "out of the centre," it may be suspended "centrally," and a spring be employed to cause one end to preponderate over the other.

[Printed, 8d. Drawing.]

A.D. 1855, June 15.—N° 1366. (\* \*)

CLAY, WILLIAM.—"The application of certain descriptions of "bar iron to purposes where strength or stiffness is required." The invention consists in applying angle "iron, T iron, double T iron, and single or double grooved or channel bar iron, rolled "in such a manner as to taper or gradually increase or diminish "in sectional area from one point of its length to another, so "that one part may be made thicker and stronger than another," to purposes where great strength or stiffness is required, as in "ships' knees, beams for ships or other structures, corner pieces "for railway waggons, or any wooden structure where two pieces "or beams of wood are mortised or attached to each other, and "form an angle or corner. Bar iron made in this manner may "also be employed for wrought-iron beams or girders, or ribs for "wooden or iron ships, and also for making wrought-iron spokes "for railway wheels."

[Printed, 6d. Drawing.]

A.D. 1855, June 16.—N° 1375.

VAUDELIN, LAZARE FRANÇOIS.—(*Provisional protection only.*)  
—"Improvements in railway breaks or brakes."

This invention relates to an arrangement of screw brakes, "which press on the wheels horizontally," and includes "a contrivance for one man to brake two or more carriages."

"The brakes are of the usual shape, but having rigidly attached "to them square bars of iron, which are fixed horizontally and "supported by suitable bearings; these bars are made to move "in a horizontal direction by means of a shaft, having a right-handed screw cut on one end and a left-handed screw on the



" other end. These screws work in holes in the square bars, " having threads cut therein, and by the revolving of the shaft " either way the wheels are braked or unbraked," the shaft being made to revolve by means of suitable gearing and a shaft which may be turned by hand; this shaft extending the whole length of the carriage, and the shaft of one carriage being if desirable united to that of another by the square end of one shaft entering a square socket at the end of the next, by which means the brakes of a number of carriages may be operated upon simultaneously by one person. "The screw brakes may be operated upon by " levers, screws, or cog wheels."

[Printed, 4d. No Drawings.]

A.D. 1855, June 18.—N<sup>o</sup> 1390.

BESSEMER, HENRY.—"Improvements in the manufacture of " railway wheels."

This invention consists of casting railway wheels by running molten steel into a mould of dry loam or sand, such wheels being thus each formed "of cast steel complete in one piece, although " any separate portion of the wheel may be so formed if desired," the patentee stating the wheels thus formed may be of considerably less weight than those composed of iron, but will at the same time be more durable. In order to provide against the production of gas by the accidental admixture with the materials composing the mould of any extraneous substances capable of producing gas, and which might lead to the casting being blown or spoiled, the loam or sand should be brought to a low red heat previous to the pouring in of the melted steel, and the sand or loam should also be carefully arranged so as to admit of the escape of expanded air. After a wheel is cast it should be kept for several hours at a red heat in an annealing oven, in order to toughen the steel, the wheel being then gradually allowed to cool. The external surface of the wheel may be hardened by being cast against an iron chill; or after the wheel has been turned and finished the tyre may be hardened by quenching it in water or oil while in a heated state. Iron may be mixed with the steel if desired, such a mixture being cheaper than steel alone. The steel or mixture of iron and steel may be melted in crucibles in the ordinary manner, but the patentee states that he prefers to use the process set forth in the Specification of another patent granted to him, and bearing the same date as the present patent, whereby the metal may be melted

in crucibles of larger size than usual, and run into the mould without the crucibles being removed from the fire.

[Printed, 4d. No Drawings.]

A.D. 1855, June 18.—N° 1391.

MYERS, EDWARD, and POTTER, JOHN WRIGHT.—(*Provisional protection only.*)—"Improvements in buffers, draw springs, and bearing springs."

This invention relates to "pneumatic" buffer, draw, and bearing springs. "The elastic medium is obtained by the application of atmospheric air confined in a cylinder, in which works an air-tight piston, the rod of which is fitted with a buffer head, or is connected to the draw bar, or attached to the body of the carriage, according as the apparatus is used as a buffer, draw spring, or bearing spring."

"The bottom of the cylinder is closed, with the exception of a small air aperture, which is fitted with an air valve opening inwards. The lid or cover of the cylinder is left open, or perforated, to admit the air freely into the front end of the cylinder." The rod of the piston or plunger passes through an aperture in the cylinder cover, and in case a slight escape of air should occur through the air valve, it is proposed to employ a spring, or springs, for the purpose of returning the piston to its first position after being brought into action, such spring or springs, however, not being meant to exercise any "buffing" action."

"By another arrangement the cylinder of the buffer may be partially filled with liquid, and an air chamber formed at the end of it communicating with the interior of the cylinder, so that, as the piston is pushed into the cylinder, the level of the liquid will rise and compress the air within the air chamber, thereby forming an effective cushion or elastic medium for the piston to press against."

[Printed, 4d. No Drawings.]

A.D. 1855, June 20.—N° 1417.

FABIEN, JEAN FRANÇOIS VICTOR.—(*A communication.*)—"Improved machinery for manufacturing wheels."

This invention "relates to a novel construction of machinery for manufacturing wrought-iron wheels, wherein the combined

" action of an ascending die and pressing rollers is employed for " moulding or shaping up the heated metal." The metal is first heated and placed in a die, and then subjected to the action of a forge hammer, and is next operated upon by a series of pressing rollers mounted in a rotating frame, the lower end of the axis of which is pointed, and makes its way through the centre of the disc of heated metal, acting " as a cue to keep open the hole " intended for the insertion of a carriage axle."

Wheels with " radial or other ribs " may be formed by the use of dies shaped accordingly, and when these rollers have operated upon the metal to a sufficient extent the die, with the partly formed wheel, is removed from the machine, and a suitable tyre shrunk thereon by proper means. The die may be borne upwards or towards the rollers, by means of hydraulic or any other suitable pressure.

[Printed, &c. Drawing.]

A.D. 1855, June 22.—N<sup>o</sup> 1438.

ALLEYNE, JOHN GAY NEWTON, and STRAFFORD, HENRY.  
—" Improvements in railway brakes."

In describing this invention the patentees first mention that the ordinary brakes employed for railway waggons " consist of a lever " turning upon a centre and having a long horizontal arm and a " short vertical arm carrying a block of wood, which is pressed " against the wheel by applying pressure to the end of the long " arm of the lever. A hook is provided to support the end of " the long arm of the lever when the brake is not in action. The " brake is thus only kept in action by the attendant pressing " upon the lever by hand, or in some cases standing upon it. A " plate with a series of holes has sometimes been fixed to the " waggon, and a pin inserted in one of the holes to keep the " brake lever down, but these plates are much exposed and very " liable to injury," accidents also occurring from the long arm of the brake lever falling to the ground.

They then state that they " construct the brake lever with a " rack or series of teeth near its extremity," and " place over it a " paul or bar, turning on a pin or joint on the frame of the " waggon. When the brake lever is depressed this paul falls " into the teeth of the rack on the lever, and keeps it down until " it is released by the attendant. The lower end of the bar is

“ formed with a loop to embrace the lever, so that it cannot fall to the ground. The lower part of this hoop is made to catch in a tooth or notch in the under side of the brake lever, to keep it up when the brake is not in action. Instead of the teeth or rack a row of holes may be made in the brake lever, and a pin or pins may be inserted in these holes to keep the brake lever in the required position.”

Different modifications of the details of the invention are described.

[Printed, 6d. Drawing.]

A.D. 1855, June 28.—N° 1472.

RAYWOOD, JOHN.—“ An improved method of stopping railway trains.”

One of the main features of this invention consists in the employment of “an additional line of wood or iron of a suitable or necessary length to be laid down principally at stations,” or “at any part of the line where considered necessary,” upon which additional line the breaks are made to act as well as upon the wheels when it is desired to stop the train. These breaks may be brought into action by the employment of steam, which being made to act upon a piston brings into operation certain draw bars, cranks, and levers, to which break blocks are connected, the steam required being supplied from the boiler of the locomotive engine. The invention is described in a somewhat peculiar manner, the patentee stating that he does not confine himself to the use of steam, as the breaks “may be worked by hand-gearing, self-acting or otherwise, as on the guard’s van, or when the carriages or trucks are detached from the engine or tender,” and that the breaks may be variously shaped and applied to any part or to the whole of the train. One mode of carrying out the invention is described in which the tender has beneath it a cylinder or cylinders, which may be supplied at pleasure with steam from the engine, and will in that case not only apply breaks as aforesaid, but also operate upon the buffers so as to “retard and force the train from the tender to the extent of chain or coupling, and enable the driver to reverse his engine much sooner and with less injury to the same,” the effect of this being to “form one continuous buffer break throughout the line of carriages, if necessary.” Springs, air chambers, and

other apparatus are described in connection with the invention, but the use thereof is by no means clearly set forth.

[Printed, *ed.* Drawing.]

A.D. 1855, July 6.—N<sup>o</sup> 1514.

ASBURY, JACOB VALE.—(*Provisional protection only.*)—"Improvements in apparatus for neutralizing the effect of collision or impaction in railway trains, stations, and other similar situations."

The Specification of this invention, which is short, is as follows:—

"I prolong the time of pressure between contact and perfect impaction taking place by means of the resistance offered by atmospheric air when confined within a cylinder or cylinders, and acting against a piston; also by a series of elastic air cushions to be used either in combination with the atmospheric air, or the atmospheric air to be used alone, thereby accommodating or neutralizing the forces of momentum and inertia, which I carry into effect in the following manner, that is to say:—Within the horizontal frame of the carriage and in the line in which the forces are applied I fix four or more metal cylinders; these cylinders are each of them fitted with a metallic disc or piston, which is screwed or otherwise fixed upon the end of the buffer rod, and each piston is provided with a proper shifting valve, with stop to regulate its travel. The cylinders are also provided with a longitudinal valve, faced with leather or other yielding material and kept closed by an elliptical or other spring, so regulated as to allow the valve to act when the atmospheric air within the cylinder arrives at its maximum density. A series of elastic air cushions are also provided, composed of indian rubber or other material, and furnished with a solid eye, having a hole through its centre to receive a guide bar, which not only supports the cushions, but preserves their line of direction by passing through a stuffing box at the end of the cylinder or cylinders. By this apparatus the absorption or loss of force goes on as long as space for compression remains, and in a train of ten or twelve carriages, all alike, constructed with this self-acting safety apparatus, the compressible space will be sufficient to absorb such an amount of force that if any remain it will not be more than enough to carry the train onwards a

"few yards, so that fracture of limbs and carriages must be prevented."

[Printed, 4d. No Drawings.]

A.D. 1855, July 11.—N° 1546.

JOHNSON, JOHN HENRY. — (*A communication from Pierre Joseph Bertrand Geoffrey.*)—(*Provisional protection only.*)—"Improvements in the permanent way of railways, and in carriages to be used in connection therewith or on common roads."

That part of this invention which relates to railway and other carriages consists in forming each of the wheels of such carriages with "a species of broad double tyre, that is, although the tyre is made in one piece yet one portion is of slightly larger diameter than the other, the larger diameter or flange being made sufficiently broad for running on common roads, whilst the small portion or diameter of the wheel is adapted to run on the rails of the permanent way." The wheels are also so constructed as to be made either fast or loose upon their axles, "according as the vehicle is intended for running on a railway or on a common road. This is effected by a suitable clutch and pin or key passed through the axle, the arms of the clutch being made to enter between the spokes of the wheel, which will then be in gear with it and fast on the axle; but in order to release the wheel the clutch is reversed, the arms and pins being turned from the wheel, whereupon the wheel will be free to rotate on its axle."

That part of the invention which relates to the permanent way of railways will be found in another series of abridgments.

[Printed, 4d. No Drawings.]

A.D. 1855, July 12.—N° 1561.

CHATTAWAY, EDWIN DANIEL.—"Improvements in buffing and coupling apparatus for railway carriages and rolling stock."

This invention relates to "the combination of the whole of the buffing, coupling, and drawing apparatus of railway carriages and rolling stock upon a single central rod in each case, thus dispensing with the use of separate corner buffers and side chains, as hitherto employed. It is an essential feature of this contrivance that the buffer and draw hook are in each case combined in one piece or arrangement. Instead of being a plain circular disc, the buffer head is of a peculiar irregular form, the



“ lower portion or side being curvilinear, approximating to a  
“ semicircle, whilst the upper portion is a narrow rectangular  
“ piece, so that the end of the wide coupling link embraces this  
“ projection,” and “ can work upon it as upon a draw hook. The  
“ draw rod is screwed near its end just within the buffer head  
“ thereon, and upon this screwed part is fitted an adjusting nut  
“ and collar apparatus, with projecting arms, carrying links con-  
“ nected with the large coupling link. By this means the coup-  
“ ling can be drawn hard up or slackened off, as may be required.  
“ The inner face of the upper projection of the buffer head is  
“ shaped like a large hook, so that the wide link of the neighbour-  
“ ing carriage, when dropped upon it from the upper sides, pro-  
“ duces the hook and link connection.”

The details of the invention may be varied.

[Printed, 6d. Drawing.]

A.D. 1855, July 16.—N<sup>o</sup> 1595.

NEWMAN, JAMES, and WHITTLE, WILLIAM.—“ Improve-  
“ ments in the manufacture of axles.”

The first part of this invention consists “ in manufacturing  
“ hollow axles having solid journals, and with one or more  
“ diametrical bars or radial arms or supports running longitudi-  
“ nally through the interior, by which their tubular form is  
“ materially strengthened, whilst from the distribution of the  
“ metal the extreme of lightness consistent with the requisite  
“ strength is obtained.” Axles thus constructed are described as  
being applicable to carriages for common roads as well as to rail-  
way carriages. In the latter case the axle is of circular section,  
while an axle for common roads is of square section. “ The cross  
“ pieces are in this case placed in the diagonal of the square.”

Solid axles are also made on the same principle, the tube in  
this case being “ completely filled up.” The arrangement of the  
“ internal strengthening ” may be varied according to circum-  
stances. Thus one or more diametrical bars or radial arms may  
be used, or one bar may be placed diametrically across and  
running the entire length of the interior of the tube, “ or any  
“ suitable number of bars placed radially ” may be employed,  
various modes of carrying out this part of the invention being  
described.

[Printed, 10d. Drawings.]

A.D. 1855, July 19.—N° 1634.

JOHNSON, JOHN HENRY.—(*A communication from Charles Bricogne.*)—"Improvements in apparatus for actuating railway breaks."

This invention consists "in the employment of a moveable weight placed in communication with the actuating rod of any ordinary break, and so arranged that when the break is out of action the weight is held up or supported, but when the weight is released it instantly falls, and by its gravity supplies the power requisite for putting on the break. This weight is divided vertically, or composed of two parts, one of which is toothed, or formed into a rack in the inside, into which rack two pinions are made to gear. The axes of these pinions are each fitted with a bevel wheel, gearing into corresponding bevel wheels fast on the vertical shaft or break rod. The weight is made slightly heavier on the rack side, so that its centre of gravity in falling shall pass tangentially over the pitch lines of the pinions, by which means its force is exerted perpendicularly on the pinions, and the weight is less liable to get jammed. The weight is guided by anti-friction rollers working on studs fitted into suitable brackets or standards, which are bolted to any convenient part of the carriage or waggon. An ordinary hand wheel or winch handle and a ratchet wheel are keyed on to the top of the vertical shaft or break rod. A detent of a peculiar construction takes into the teeth of the ratchet wheel, and, by preventing the break rod from turning, keeps the moveable weight elevated until required for action. This detent works on a fixed centre in a suitable supporting plate, and is kept pressed against the teeth of the ratchet wheel by a blade spring."

"The tail of the detent is jointed to a link, which is also jointed at its opposite end to the tail of a lever or handle, which throws out the detent when the break is to be put on, this handle being actuated by the guard of the train." And by the use of suitable connections between the parts attached to the several carriages of a train, "the whole of the weights may be released at once, and the breaks applied simultaneously throughout the entire train," the weights being raised again "by turning the various break rods by the hand wheels or handles attached to them, which may also be used in the ordinary manner for still further tightening the breaks."

The invention is minutely described, but the details thereof may be varied.

[Printed, 10d. Drawing.]

A.D. 1855, July 20.—N° 1643.

JOHNSON, JOHN HENRY.—(*A communication from Edmond Roy.*)—(*Provisional protection only.*)—"Improvements in axles " for railway and other purposes."

This invention consists "in forming the axle of two parts, joined " or united by a suitable coupling box in the centre of the axle," the coupling box, however, being so constructed that the two parts of the axle can rotate separately, and thus, in the case of a railway carriage, allow the wheels to adapt themselves to the traversing of curves in the line of rails. According to one mode of coupling, the ends of the two parts of the axle which are to be joined are furnished with flanges or shoulders, and kept together by collars and set screws, small spaces being left between the segments to admit of their being tightened up as the axle wears, but vulcanized india-rubber being introduced into the spaces to keep out dust, &c. This arrangement may be varied by making one half of the axle fit into a cavity in the other half, the two being kept together by collars and segment pieces, and a large nut which screws upon the latter, the nut being kept in its place by set screws, and suitable arrangements made for keeping out dust, &c. from the apparatus. In another arrangement the two axles are kept together by collars and a coupling nut merely. In another arrangement one axle enters a bored out portion of metal which forms a tube, and is keyed to the other, being secured therein by a coupling nut. Collars, loose washers, and bolts; collars and a hinged bearing piece; a mandril entering recesses in the axles; and separate bearings for the inner ends of the axles, constitute other arrangements suitable for application in carrying out the invention. The latter may be applied not only to railway carriages, but also to carriages for common roads.

[Printed, 4d. No Drawings.]

A.D. 1855, July 21.—N° 1653.

MYERS, EDWARD.—"Improvements in buffers and other springs " for railway and other carriages."

This invention relates to "a peculiar arrangement of helical " springs for obtaining an elastic buffing action, or for breaking

" the shocks arising from the inequalities of the road or the  
 " tractive power of the engine," and consists "in fitting two or  
 " more helical springs in a suitable spring box or casing, each  
 " spring being placed in a separate and distinct compartment of  
 " its own," and such compartments being concentrically arranged,  
 " so that the inner springs will be of smaller diameter than the  
 " outer ones."

" The inner end of the buffer rod, or other portion receiving  
 " the shocks, has a number of annular projections formed on it  
 " or fitted thereto, such projections corresponding with and  
 " fitting into the chambers containing the springs. The springs  
 " are all made of gradually increasing or decreasing lengths, so  
 " that the buffer, if applied thereto, will first be brought into  
 " contact with only one spring, and then with a second, and so  
 " on, thus meeting with greater or increased resistance the further  
 " it is pushed inwards, by which means the shocks sustained by  
 " the buffer are more gradually deadened than by the existing  
 " arrangements."

This arrangement of springs is applicable not only to buffers,  
 but also to draw bars, and likewise as bearing springs.

[Printed, 8d. Drawing.]

A.D. 1855, July 23.—N° 1668. (\* \*)

ACHARD, AUGUSTE. — "Improvements in the application of  
 " electricity as a transmitting agent of motive power."

Various applications of electricity as a motive power are  
 described, the chief of which are, 1. " Means for retarding and  
 " stopping trains on railways;" 2. " Means by which the winding  
 " of silk may be facilitated." The former is the only application  
 relating to a railway signal in connection with the break proposed  
 by the patentee, and is thus described:—

When the object is to apply the break to the wheels thereby to  
 stop the progress of the train, the patentee applies "to one of the  
 " shafts or axles of the break apparatus (say the shaft or axle upon  
 " which is fitted the crank handle, by which the guard or other  
 " attendant brings the break into operation), a ratchet wheel  
 " having a series of teeth which are capable of being taken into  
 " and driven by a catch or driver, supported by a suitable arm or  
 " other carrier; there is also a supplemental arm or carrier, which  
 " is actuated through suitable links and parts by an eccentric on  
 " one of the axles of the main wheels of the carriage. The

“ supplemental arm and the carrier to the catch or driver carry, the one an electric coil, the other its armature; when, by a current of electricity being caused to flow through the coil, this connection takes place, the catch or driver will follow the supplemental arm or carrier, and by moving with it will take into fresh teeth of the ratchet wheel, to cause that ratchet wheel to rotate till the required pressure is obtained to the break.”

“ A modification consists in an arrangement by which trains on a line of railway may be prevented running into each other. A metallic conductor, interrupted at certain distances, is laid down between the two rails, and upon the whole length of the line. This conductor consists of a thin ribbond-like band of iron, fixed in brackets of wood or other non-conducting material. Parallel with and near to this first conductor is another, continuing also the whole length of the line, and similarly interrupted at intervals; but the points of interruption in this second conductor do not correspond to those of the first; they are opposite the middle of each unbroken length of the first conductor. Every train is furnished with a battery, and every break handle with a similar apparatus to that already referred to.”

“ The carriage upon which the battery is placed is furnished with two metallic rubbers, fixed to jointed rods. These rubbers bear constantly, one upon the two conductors placed between the rails, and the other upon one of the two rails or trams. Both are in metallic communication with one of the poles of the battery. The metallic wire, starting from one of the poles or electrodes, goes, before joining the corresponding rubber, towards the electro-magnet, runs successively over them, and returns to attach itself to its rubber. The batteries are disposed in the same manner in all the trains; the positive electrode, for instance, is always to the right of the train in the direction it is pursuing.”

“ When two trains coming to meet each other find themselves at the same moment upon the same uninterrupted length of metallic conductor, it is clear that the electric circuit will be complete, the two batteries being then in metallic communication by the rubber bearing upon the same conductor. By this inverse position of the two trains, the two batteries will have their electrodes or poles placed inversely, and the two currents will act in the same direction, and be added one to the other; consequently all the electric-magnets will put themselves into

“ activity, all the breaks will be tightened on both sides, and the trains will thereby be stopped before meeting.”

“ In case of danger at any point on the road, it would be sufficient to put one of the conductors in electric communication with one of the rails, which would complete the electric circuit of all trains coming towards the scene of danger, and every train coming in any direction would be stopped at a certain distance. In case of an unexpected inundation, the trains would be stopped at a certain distance from each other from the point at which the submersion of the road begins, because the current would be re-established between the conductor and the soil. A considerable land slip covering a part of the road would produce the same effect. The mechanism would, in case of need, set in play a peal of bells at the very moment the breaks begin to approach the wheels; the engineer of the locomotive would then be warned, and could let off the steam or reverse the engine as he might deem fit. The mechanism brought into operation to put the break on may also be caused to turn the steam off the engine, and thus facilitate the stoppage of the train.”

*Claims.*—1. “The arranging and combining apparatus to be employed as a transmitting agent of motive power as explained.”

2. “The arranging and combining electric apparatus as a transmitting agent of motive power to be used in retarding and stopping trains on railway.”

3. “The arranging and combining apparatus by which electricity as a motive power is made available to facilitate the winding of silk from cocoons.”

[Printed, 1s. 10d. Drawings.]

A.D. 1855, July 26.—N° 1700.

HANCOCK, ROBERT HENRY.—(*Provisional protection only.*)—

“Improvements in the means of stopping carriages or trains to prevent railway accidents.”

This invention relates to working the breaks of railway carriages. Upon one of the axles of one or more or all of the carriages of a train a worm is fixed, with which a worm wheel may be thrown into gear at any time, and again withdrawn therefrom by a person on the train, or, if requisite, by a person on or near the line of rails. Beneath each carriage (when the invention is to be applied to all the carriages of the train) is a long rod carry-



ing a slotted sector or cam, by means of which, on turning the rod partially round, a lever is brought to bear upon the wheel, and causes it to slide upon an axis on which it is placed, the wheel, when brought into gear with the worm, causing that axis to rotate along with a bevil wheel placed thereon. The latter then communicates motion to a second bevil wheel which is in gear therewith, and to a spindle or axis on which the latter is placed, and which is mounted across the framing of the carriage and furnished with crank arms or eccentrics which press the break blocks against the wheels, such break blocks being mounted in any convenient manner so that the breaks may readily operate upon them. In order to remove the pressure of the breaks from the wheels the worm wheel is withdrawn from the worm by a reverse movement of the long rod mentioned above, and the action of the worm on that wheel then ceasing, the breaks are no longer acted upon by the eccentrics. If preferred, the worm may, however, remain constantly in gear with the wheel, and clutches be used to connect the latter with or disconnect it from the rest of the apparatus. The long rod of one carriage is connected to that of another by a coupling piece of suitable construction, and which may form a part of the ordinary coupling for connecting the carriages together, but the invention may, if preferred, be applied to one carriage only of the train, in which case no coupling piece in connection with the long rod will be required. Such long rod must be provided with a lever or other suitable means of moving it to and fro, and when the apparatus is applied to all the carriages of a train, and the several rods coupled together, the action of one lever will of course move the whole, and so bring the breaks of all the carriages into action simultaneously. Different arrangements of mechanism may be employed to cause the axis of the worm to operate upon the breaks, as this may be effected "either by wheels, screws, cranks, levers, wedges, or by hydraulic or hydrostatic power," the essential feature of the invention being the employment of the worm upon the axle and the worm wheel in combination therewith, from which wheel the break apparatus may be actuated by any suitable means.

(*Tracked, &c. No Drawings.*)

A.D. 1855, August 9.—N<sup>o</sup> 1807.

ADAMS, WILLIAM BRIDGES.—(*Provisional protection only.*)—  
"Improvements in locomotive engines and their trains."

One part of this invention consists in causing the driving wheels of locomotive engines to rest upon rolling wheels placed below them, instead of upon the rails of the railway, as usual. The arrangement is such that each driving wheel rests upon two rolling wheels, a great amount of adhesive power being thus obtained, and, the rolling wheels being all loose upon their axles, uniformity in size of the driving wheels being unnecessary; "and two pairs of rolling wheels, with the driving wheels pressing on them, will be a substitute for what is usually called a coupled engine." These rolling wheels may be placed under the drivers of an ordinary engine, and the leading and trailing wheels be lowered to the level of these rolling wheels; or the driving axle may be placed above or through, or sunk into the top of the fire box or boiler, and the peripheries of the wheels may be of any desirable sectional form, the inventor stating, however, that he prefers the cylindrical form for the drivers and rollers, the drivers being provided with flanges to keep them in position with the rollers, which are without flanges, the engine being kept in position on the rails by flanges on the leading and trailing wheels. The boiler and engine may be supported upon springs on the driving axle, and also on springs upon the axles of the rollers, and springs may also be applied in any convenient manner between the boiler and the leading and trailing wheels, and an arrangement may be made to lift the driving wheel on one side of the engine out of contact with the rollers beneath it, or to uncouple the driving wheels by the use of a divided axle, and the adhesion of the driving wheels to the rollers may be increased by the use of "coned peripheries, so arranged that the centrifugal force on curves will vary the diameters in contact, and vary the speed." In order to prevent the effects of concussion between the driving wheels and rollers, or between the latter and the rails, a ring of caoutchouc is placed between the tyre and the inner periphery of each driving wheel, the arrangement being such that the tyre is capable of moving slightly round the body of the wheel on pressure being applied thereto, "so that the inner portion or body may begin moving before the tyre." If desirable, four rolling wheels may be applied to each engine, or two engines of this construction may be coupled together.

Another part of the invention consists in placing the boiler below the axles, and in certain other arrangements which do not

require particular notice here, as they belong to the subject of another series of abridgments.

[Printed, 4d. No Drawings.]

A.D. 1855, August 13.—N° 1834.

HORSFIELD, WILLIAM. — (*Provisional protection only.*)—  
“Improvements in the construction of axle boxes for railway  
“carriages.”

The object of this invention is to render axle boxes more simple in construction, stronger, more durable, and less expensive than those in ordinary use. Instead of the principal part of the axle box being composed of several separate pieces of metal, as usual, it is cast “in one entire piece of metal, and of such shape as to  
“dispense with the necessity for employing hinges, pins, rivets,  
“or screws, or other fittings commonly employed in the construction of axle boxes. The top of the axle box is likewise  
“peculiarly formed, so as to receive and securely hold the weight  
“spring upon which the body of the truck or carriage rests without the use of screws or such like ordinary fastenings; the  
“cover of the grease box is also maintained dust-proof by means  
“of a spring, so contrived and applied as to require neither  
“fitting or fastening to the axle box, said spring being held in  
“proper position solely by the superincumbent pressure upon  
“the weight spring, which rests upon the spring of the grease  
“box cover.”

[Printed, 4d. No Drawings.]

A.D. 1855, August 21.—N° 1894.

PAIGE, LUCIUS.—“Certain new and useful improvements in  
“brake mechanism for railway carriages.”

One main feature of this invention consists in the employment, for the purpose of bringing the brakes into action, of two levers placed on the same fulcrum and crossing each other, springs being applied between the said levers, “and on opposite sides of the  
“fulcrum respectively, connecting both arms of the one or the  
“longer of said levers with the draft chains or rods of two wind-  
“lasses situated at opposite ends of the carriage body or plat-  
“form, and respectively connecting the two arms of the other  
“lever to the draft rod or chains of the brake levers,” the  
arrangement being such that on one lever being acted upon it

acts upon the other through the medium of the springs, the latter being compressed, and not, as in various arrangements which have been applied to a similar purpose, extended, the patentee mentioning several advantages as arising from this system. The brakes themselves are each formed of a rubber which extends entirely through a socket or bearing with which it is connected, being capable "relatively to the socket, of being screwed " up to or towards the wheel, as occasion may require, until it " (the said rubber) may be worn off or rendered unfit for further " service." The invention is described as being applied to a railway carriage "having swivelling truck frames," but with the exception of the particulars mentioned above the details of the invention are of an ordinary character.

[Printed, 10d. Drawings.]

A.D. 1855, August 27.—N° 1939. (\* \*)

LUDBROOK, SAMUEL.—"Improvements in railway wheels." "Forming the periphery or outside edge of railway wheels of " wood, forced and pressed into and between suitable holding " plates and chambers in such manner as to form a very hard " and compact surface, with the grain of the wood so placed as " to be at right angles, or as nearly so as may be, to the surface " of the rail at the point where the edge of the wheel comes in " contact therewith."

[Printed, 6d. Drawing.]

A.D. 1855, August 27.—N° 1940. (\* \*)

JOHNSON, WILLIAM.—(*A communication from Jackson Brothers, Petin, Gaudet, and Company.*)—"Improvements in machinery or apparatus for rolling or shaping metals."

Articles either perfectly cylindrical or conical, or of forms of varying diameters, may be rolled of the required shape by means of rolls of the contour required for the rolled article. Three rolls are employed; the two lower rolls rotate side by side in fixed bearings; the upper roll is carried in moveable sliding bearings which are moved up and down in the frame of the rolls by means of screws actuated by bevil wheels. The article, as, for instance, a railway axle, being laid on or partially between the lower rolls, the upper roll is pressed down upon it by means of the screws which move its bearings, and so give it by pressure the required shape.

[Printed, 8d. Drawing.]

R. C.

L. L.

A.D. 1855, August 27.—N° 1941.

JOHNSON, WILLIAM. — (*A communication from Dominique Didier.*)—"Improvements in railway breaks."

In this invention the breaks "consist of skids or sledges of hard wood, let into suitable cast-iron frames or sockets, which are bolted to the carriage framing. The ends of the ordinary suspension springs are connected by links to short levers, fast on the ends of transverse shafts, placed below the carriages. These shafts are each fitted with a lever arm," in connection with rods worked by a horizontal lever, "which works on a fixed fulcrum in the centre of the framing. Another rod, connected with the end of the horizontal lever by a nut and screw having a large pitch, serves to bring the break out of action when deemed desirable. This shaft is prevented from turning by means of a suitable forked key or detent fitting on to a square or flat portion of the shaft. When this key is raised or removed to bring the breaks into action, the weight of the carriage turns over the levers connected with the carriage springs, and thus allows the entire carriage with its load to descend until the skids or sledges are brought in contact with the rail or rails, thereby speedily stopping the train. The carriage is raised by turning the screwed shaft with a winch handle, and thereby bringing the rods and levers into their original position again." The break mechanism, of the several carriages of a train may of course be connected, if found desirable, by suitable coupling, so that the whole of the skids may be applied simultaneously.

The details of the invention may be varied; screws, for example, being used in some cases for raising and lowering the carriage.

[Printed, 10d. Drawing.]

A.D. 1855, September 3.—N° 1989.

FLYNN, HENRY EDWARD. — (*Provisional protection only.*) — "Making connections between and adapting appliances to locomotives and all descriptions of railway carriages, whereby the possibility of accidents resulting from the breakage or dislocation of their wheels or axles is prevented, or the chances thereof greatly diminished."

This invention consists in uniting the locomotive and the several carriages of a railway train "by means of hollow, cylin-

"drical, or socket buffers and counter cone-headed spindle buffers, so that with the present ordinary couplings perfect support and reciprocal action on the several carriages is obtained, preventing, in the event of breakage or dislocation of wheels or axles, their falling over, coming down, upsetting, oscillating, bounding, going out of place, or off the line."

"The appliances consist of a solid flat bar of iron, fastened athwart the under surface of the frame, and having its ends bent at right angles, or nearly so, down to the axles, and having hinged thereto a loose iron collar, which encloses the axle, having a space all round, and without in any part touching or interfering with the axle until accident calls it into play to support or retain the axle in or near its proper position."

[Printed, 4d. No Drawings.]

A.D. 1855, September 12.—N° 2061.

MACINTOSH, JOHN.—"Improvements in springs."

According to this invention membranous tissues or skins are prepared "in glycerine, or in glycerine and gelatine mixed with water, so as to render them pliable and impervious to air or air-tight." Such material is then formed into a bag, and placed inside a cylinder, the bag containing air, and a plunger is then inserted into the cylinder, and rests upon the bag, the apparatus then forming "an elastic air spring," which is particularly described as applicable for the buffers of railway carriages, the plunger being of some length, and the buffer head being attached to the outer end.

The patentee mentions that instead of a bag he sometimes fixes a diaphragm of similar material in the cylinder, the plunger acting upon such diaphragm, and concludes by stating that he does not confine himself "to the material specified in the manufacture of the air bag," as "any other suitable material may be used."

[Printed, 6d. Drawing.]

A.D. 1855, September 21.—N° 2123.

PARKINSON, GEORGE SEABORN.—"Improvements in railway breaks."

According to this invention one axle of a railway carriage has upon it a loose clutch, on the collar of which is a cam, and a corresponding clutch is also fixed upon the axle, and constantly



rotates therewith when the carriage is in motion, the loose clutch being capable of moving to and fro on the axle, and so being placed either in or out of contact with the fixed clutch at pleasure. When so placed in contact the loose clutch with the cam is caused to revolve, and act upon a lever suspended from the framing of the carriage, this lever being connected by means of rods and other suitable mechanism with the breaks, which are of the usual description, and the latter being alternately brought into action and released "without effectually locking the wheels." In order to place the two clutches in contact a forked lever is arranged in connection with the sliding clutch, which is acted upon by a spring when the clutches are not required to operate, and so keeps them apart, but is moved when it is requisite to bring the breaks into action by means of a short arm provided with an anti-friction roller, between which and a similar roller mounted on a fixed stud the wedge-shaped end of a short sliding bar is forced by the movement of a long bar extending from end to end of the framing of the carriage, and connected to the short bar by a chain or cord, the short bar being drawn back, so as to cause the disengagement of the clutches, on the return of the long bar to its first position, by a spring arranged for the purpose. The long bar of one carriage of a train is connected to that of another by chains and hooks, and the whole may be operated upon simultaneously by similar rods mounted below the "guard's carriage" and connected with chains which are attached to a drum, capable of being turned by hand through the medium of a screw and other suitable apparatus. If the invention is applied to one carriage only of the train, however, the drum need not be used, a chain or cord from the long bar of that carriage passing to the guard's carriage, and the apparatus being brought into action by simply pulling at such cord or chain.

The details of the invention may be varied, in some cases the clutches being forced into gear by a short bar having a recess therein, within which a roller on the clutch lever rests when the clutches are out of contact, but which short bar is moved by the long bar (to which it is attached) when the breaks are required to act, thus forcing the roller out of the recess, and bringing the clutches together.

The effect of these arrangements is that the breaks, when in operation, are pressed against and released from the wheels at every revolution of the latter.

[Printed, &c. Drawing.]

A.D. 1855, September 27.—N° 2156.

**NEWMAN, JAMES.**—(*Provisional protection only.*)—"Improvements in the manufacture of railway wheels."

This invention consists in the first place in a mode of manufacturing the bosses of railway wheels, by bringing a suitable piece of metal, by means of forging or pressing, into the form of a disc with certain indentations or recesses in one side thereof, these recesses extending from the circumference partly across the disc. The inner ends of the spokes of the wheel are then inserted into these recesses and a second disc, similar to the first, is then placed outside them, and the whole welded together. In another arrangement a disc is formed with radial projections on its circumference, the ends of the spokes being placed between these, a plain disc on each side of the first, and the whole then united by welding.

The inventor also manufactures disc wheels by coiling a strip of iron into such form as to fit into a matrix of a shape suitable for one side of the wheel, and then by means of a die, "having a similar form on it," forging or striking the metal into the requisite shape, and welding the coil by the same operation. In making tyres from a strip or coil a matrix is used, in which the coil is placed, and then operated upon by a central die or plug, having a groove in its lower edge which forms the flange or fin on the inner periphery of the tyre.

[Printed, 4d. Woodcuts.]

A.D. 1855, September 29.—N° 2171.

**MITCHELL, JOSEPH.**—(*Letters Patent void for want of Final Specification.*)—"Improvements in buffers and draw springs used for railway and other purposes."

This invention consists "in arranging inclines or cones so as to act on segmental pieces which are encircled by elastic hoops, the inclines or cones, or the segmental pieces and elastic hoops, being attached to or formed on the buffer or draw bar, so that the movement of the buffer or draw bar will cause the inclines or cones to separate the segmental pieces, this separation being resisted by the elastic force of the hoops, which will bring the segmental pieces together, again forcing back the buffer or draw bar when the counteracting force is removed from them."

[Printed, 4d. No Drawings.]

A.D. 1855, September 29.—N<sup>o</sup> 2175.

BEATTIE, JOSEPH.—“Improvements in the construction of “ railway wheels and axles.”

One part of this invention consists “in forging the parts of the “ iron spokes which form the nave of the wheel so as to allow “ wrought-iron rivets or bolts to pass through or between their “ joints, and through the iron or metal washers which are placed “ on each side of the wheel to complete the formation of the “ nave,” the nave ends of the spokes and the washers being thus firmly riveted and fixed together before the nave is welded. The outer portion of each spoke is bent so as to form a part of the rim of the wheel, the ends of such portions being united not only by welding but by the employment of pieces of metal of a dovetailed or other suitable shape. The wheel thus partially formed is then bored out and turned, and a tongued projection, dovetail, or rib is formed on each side of the rim, a tyre being then provided so as to correspond therewith, and finally secured thereon by the use of dovetailed or other suitably shaped segments of metal. In some cases the patentee constructs wheels partly of wood and partly of iron, in such cases iron hoops or rings being shrunk on, rivetted, or bolted to each side of wooden segments composing the body of the wheel, these hoops or rings having flanges or tips rolled on their outer sides, and a tyre of corresponding figure being connected thereto.

According to another part of the invention hollow axles are formed of pieces having “edges alternately with tongues and ribs “ and grooves, so that they may fit each other;” or each edge of the pieces of metal which compose the axle is furnished with grooves, so that tongues or suitably-shaped pieces of iron or steel may be introduced for the purpose of cramping or binding such pieces together before being welded. Hollow axles are also formed of “segmental longitudinal pieces of malleable iron” furnished with tongues or projections and grooves, longitudinal bars of metal, similarly furnished, being used to unite the segmental pieces previous to welding, such bars being of steel, if desirable. Solid axles are formed by similar means, or by employing longitudinal segmental pieces which converge to the centre, or nearly so; when they do not converge entirely to the centre a core of steel being used to make the axle solid. Either solid or hollow axles are also formed of a number of rolled segments of iron, *which are placed together and heated and twisted, and then again*

heated and welded together, either solid or hollow cores being placed within such segments, or the latter being placed within a tube which is shrunk thereon. Such segments, moreover, after being twisted in one direction may be enclosed in other segments twisted in the contrary direction; and such segments may be formed with tongues and grooves and united by cramping bars previous to welding.

Various modifications of the invention are described by reference to a sheet of drawings annexed to the Specification.

[Printed, 1s. Drawing.]

A.D. 1855, October 8.—N° 2245.

JOHNSON, JOHN HENRY. — (*A communication from Jackson Brothers, Petin, Gaudet, and Company.*)—"Improvements in the "method of and apparatus for rolling iron, more particularly "applicable to the manufacture of the tyres of railway wheels."

This invention relates principally to the manufacture of railway and other tyres by rolling "without welding," one advantage of the invention being that the seam or ragged edge usually left by rolls is entirely obviated. One pair of rolls is used for "roughing" and another for "finishing the tyre," both pairs being actuated by similar mechanism, the lower roll in each case merely revolving on its own axis, while the upper roll is so arranged as to be capable of not only revolving but also of being raised or lowered by means of screws, so as to vary its distance from the lower roll. The ends only of the rolls act upon the tyre, the lower one forming the exterior whilst the upper one forms the interior of such tyre, the rolls being also provided with discs which form the sides of the tyre. The working parts of the rolls are formed of cast steel, and the end of the upper roll may be made of the same metal, and connected to the roll by means of a tail piece, secured by a key or nut and washer.

The upper roll has a rectangular V-shaped groove around its periphery, and forms the inner circumference and outer edge or side of the tyre, whilst the lower roll is so grooved as to form the working surface, flange, and inner edge or side of the tyre. "The "pressure is thus exerted in a direction diagonal to the section "of the tyre, and consequently the enlargement of the tyre, produced by the rotation and pressure of the 'rolls' takes place "not only at the expense of the thickness of the tyre but also of

" its width, and the particles of the metal receive pressure equally  
" and in all directions at one time."

In order to facilitate the introduction of the tyre between the rolls the outer flange of the lower roll is made moveable, being attached to the sliding part of a plummer block which may be moved to and fro by means of screws and wrenches. The disc having been removed to admit of the introduction of the metal is then replaced, and the upper roll gradually lowered by means of the screws mentioned above, and which may be operated upon by a small steam engine, " furnished with a winch handle and rod in  
" connection with a worm and worm wheel, by means of which  
" the action of the screws may be increased, decreased, or stopped  
" at pleasure," the diameter of the tyre being regulated by means of two rollers, capable of adjustment by the aid of a worm and worm wheel, or by a ratchet wheel and pall acting upon a toothed segment upon which the rollers are mounted.

[Printed, 1s. Drawing.]

A.D. 1855, October 9.—N<sup>o</sup> 2259.

LEROY, NARCISSE.—"Improvements in the construction of  
" railway carriages."

This invention consists in the first place in "arranging railway  
" carriages with a longitudinal passage, with arm chairs or seats,  
" ranged two and two, one behind the other, on each side of the  
" passage," another improvement consisting in "arranging rail-  
" way carriages with a gallery or compartment fitted up with  
" washing and water closet, and also with cooking and other  
" apparatus necessary for dispensing refreshments," curtains  
being arranged between the seats if desirable.

Another part of the invention consists in arranging railway carriages with seats or beds in two tiers, one above the other, "both tiers being completely enclosed, that is to say, the upper  
" tier being under the roof of the carriage." And another part of the invention consists in arranging railway carriages "with  
" longitudinal passages, with separate chambers or compartments  
" for beds or seats" arranged on each side of such passages, such chambers or compartments being divided by partitions or curtains and furnished with suitable doors.

The invention is elaborately illustrated by a number of drawings.

[Printed, 1s. 8d. Drawings.]

A.D. 1855, October 11.—N° 2273. (\* \*)

**FAIRBAIRN, WILLIAM ANDREW, and HASLAM, GEORGE.**—  
“Improvements applicable to locomotive engines and carriages.”

To enable railway carriages to accommodate themselves to the curved portions of the way, “liberty or play” is given to the axle boxes laterally, within certain limits, by a spring action formed by vulcanized india-rubber placed in recesses in the jaws holding the axle boxes, and which exerts its elastic force upon the sides of the boxes, by acting against plates loosely fitted in the recesses in the jaws which come against the sides of the axle boxes. The force of the spring action keeps the axles of the wheels at right angles to the straight portion of the road, but gives way to the friction pressure of the rails upon the wheels in curved portions of the way, and allows the axles to assume a position that accommodates the wheels to the curve. Under this arrangement the jaws will always be a good “fit,” and will not require “lining.”

Describes an application of a similar improvement to those rods in locomotive engines which connect the cranks in wheels to be coupled together, and modify the undue strains thrown upon them.

[Printed, 8d. Drawing.]

A.D. 1855, October 17.—N° 2318.

**CLÉMENT, JULES HYPPOLITE.**—“An improved break for  
“railway carriages, parts of which are applicable to breaks for  
“other purposes.”

This invention is described in a very confused and unsatisfactory manner, but the first part of the invention appears to consist in mounting a break block at one end of an arm or lever, the other end of which is connected to a spring, the break block, when out of action, being raised above the centre or axis of the wheel, and the arm or lever being in an inclined position, the result of this being that on allowing the break block to fall into contact with the wheel the motion of the latter forces it downwards until the arm or lever to which it is connected is brought into a horizontal position, causing it to thrust against and bend the spring, the reaction of which again causes the break block to be pressed forcibly against the wheel.

This in fact appears to be the leading feature of the invention, but in connection with this are described a multitude of details,



embracing "rods running the whole length of the train" for the purpose of bringing the breaks into action; modes of lengthening and shortening the arms or levers which carry the break blocks; "freeing or disengaging the train by the reaction of the springs which serve to stop it;" and numerous arrangements of springs, levers, clutches, tappets, guides, rods, screws, links, eccentrics, tumblers, slides, universal and other joints, and other mechanism of which no clear idea can be formed without an examination of the drawings annexed to the Specification. The last part of the invention is defined as consisting in "the use of triple joints, either isolated or resting one on the other, to counterbalance a great power by a very small one before disengaging the main springs, and to obtain this result by suspending the breaks, the back one a little above the axis of the wheels, and the front one a little below it." The patentee states the invention to be applicable to common vehicles on ordinary roads as well as to railway carriages, and that it may also be applied to breaks for other purposes.

[Printed, 1s. 4d. Drawings.]

A.D. 1855, October 17.—N° 2327.

BESSEMER, HENRY.—"Improvements in the manufacture of railway wheels."

This invention is described at some length, but the essential features thereof will be sufficiently understood from the claims made by the patentee, these being for,—

Firstly, the casting or founding of railway wheels in decarbonized or malleable iron.

Secondly, the casting or founding of railway wheels in molten steel or decarbonized iron, obtained by decarbonizing crude pig or refined iron until the metal contains no more carbon than is desired.

Thirdly, the founding a wheel, or part of a wheel of malleable iron or steel, without the outer flange or tyre, which may be afterwards fixed thereon, and a complete railway wheel be thus formed.

Fourthly, forming the tyres of railway wheels by casting a ring or hoop of malleable iron or of steel of a sectional form, suitable for producing the desired form of tyre by the further process of hammering or rolling.

Fifthly, casting discs of steel or of malleable or decarbonized iron, and rolling them between plain rollers, and cutting therefrom

a hoop or ring of the metal for the purpose of forming a wheel tyre, and

Sixthly, rolling discs of malleable iron or steel so as to give them a greater thickness towards the central part than at their outer edges, when such discs are used in the manufacture of railway wheels.

Arrangements for carrying out the different parts of the invention are fully set forth, but these may be varied.

[Printed, &c. Drawing.]

A.D. 1855, October 27.—N° 2406.

SPEED, JOHN JAMES, jr.—“Improvements in car and carriage springs.”

This invention consists “in corrugating or furrowing metallic plates of a dish-shaped form for car and carriage springs, so that from their peculiar construction the fibres of the metal can expand and contract without straining the plates, or rendering them liable to be split or broken,” these plates being placed together in pairs or sets, “so that any desired elasticity can be obtained.”

The general form of these springs is concave, with corrugations or depressions radiating from the centre, which give the outside line of each spring or plate a waving direction, or an alternation of elevations and depressions, so that when any one plate or spring lies upon any plane surface without pressure upon it, it rests only upon a few points. “The number of such corrugations and their depth will depend upon the size of the plates or springs, influenced also by other circumstances; but they should be regular in the different sizes, so that the plates or springs of any one size will correspond to and fit each other, and more particularly that the elasticity of the plates or springs may be the most perfect, and be equally distributed in all their parts. The particular shape of these plates or springs is not, however, material, as they may be either square, round, octagonal, or any other shape, their corrugated construction being their peculiarly valuable characteristic.”

The patentee mentions that for railroad cars and carriages he generally makes use of steel about one-quarter or three-eighths of an inch thick, but that for lighter carriages thinner metal may be used. He also mentions that these springs “are most easily attached to any car or carriage by means of a bolt passing

" through their centres, the ends of which enter the truck and  
" bolster, and may be readily substituted in place of any ordinary  
" springs, but more readily in place of the ordinary rubber spring,  
" as both are secured in the same manner;" these springs being  
also much less affected by variations in temperature than are such  
rubber springs.

When it is desirable to increase the strength of the springs  
without increasing their height, it may be accomplished by using  
auxiliary plates, " either smaller or larger, and placed within or  
" without the principal ones, thus making each pair or set consist  
" of two or more plates on either side, or top or bottom, as the  
" case may be."

The patentee mentions that he is aware that circular steel plates  
have been used for springs, but also mentions several advantages  
which will arise from springs constructed according to this  
invention over springs so formed.

[Printed, 8d. Drawing.]

A.D. 1855, October 29.—N<sup>o</sup> 2416.

FONTAINEMOREAU, PETER ARMAND LE COMTE DE.—  
(*A communication.*)—(*Provisional protection only.*)—" Improve-  
" ments in breaks for railway carriages."

According to this invention each carriage of a train is pro-  
vided with breaks, which, by moving a longitudinal rod jointed  
to certain levers, may be pressed at any time against the wheels.  
For ordinary purposes the movement of this rod may be pro-  
duced by means of suitable apparatus worked by hand, but to  
provide for " cases of danger " one of the axles of each carriage  
has upon it a worm, and is also provided with a worm wheel,  
mounted in moveable bearings, and so connected with a lever or  
rod and certain other apparatus placed in combination with the  
break rod and levers, that upon the worm wheel being thrown  
into gear with the worm the whole of the breaks are immediately  
brought into action. For moving the wheel into gear a weighted  
lever is used, which is made to operate upon the moveable bearings  
of the wheel upon the withdrawal of a bolt or catch, a spring at  
other times retaining the wheel out of gear. The apparatus of  
each carriage of a train may be so connected that the whole may  
act simultaneously.

[Printed, 6d. Drawing.]

A.D. 1855, November 7.—N° 2499.

HALEY, JOSEPH.—“Improvements in the buffers and spring draw bars of waggons or other railway vehicles, and in the application of the same.”

After making some observations with regard to the disadvantages attending the usual system of applying buffers, the patentee goes on to state that the main feature of his improvements in buffers consists in connecting together by means of a cross plank the two buffers at the same end of the carriage, having their separate and distinct springs of any elastic substance. The buffers are held in position by a casing or guide of cast or wrought iron, attached to the carriage frame in the usual manner, and passing round the ends of the connecting plank in such manner as to allow the ends freedom of action “in the slight radius which it describes on being forced inwards at one end only.” The parts of the casing which are in contact with the upper and under sides of the buffer or cross piece are made so as to resist the tendency of the buffer to twist in the casing on being struck by an opposing buffer above or below its centre. “The spring or elastic substance is placed within the casing between the buffer plank and the frame of the carriage.”

The improvement in spring draw bars consists in an arrangement by which the expense of separate springs and fittings is avoided and the buffer springs made to serve the additional purpose of springs to the draw bar, the latter being connected to the planks which unite the buffers, and being in two parts which are united below the carriage to a nut, and furnished with adjustable screw nuts.

[Printed, 1s. 2d. Drawings.]

A.D. 1855, November 7.—N° 2501.

CRAIG, WILLIAM GRINDLEY.—(*Provisional protection only.*)—

“Improvements in bearing, buffing, and draw springs, applicable to the rolling stock of railways and other vehicles.”

This invention relates to a mode of applying “what is technically called the sliding shoe to locomotive engines, tenders, carriages, waggons, or any kind of vehicles, whether used on railways or high roads,” and consists “of connecting the two sliding shoes by shafts or tension rods, with a spring or elastic medium between them,” the shoes being also connected “by diagonal rods or shafts to the axle boxes at one end, and the

"sliding shoes at the other for railway vehicles," while in "road vehicles" the sliding shoes are connected "with the axletrees by means of diagonal rods, as before described, with tension rods, having an elastic medium between them."

[Printed, 4d. No Drawings.]

A.D. 1855, November 9.—N° 2520.

OLIVE, JOHN, and OLIVE, WILLIAM.—"Improvements in the manufacture of wheels for railway and other purposes."

This invention consists, in the first place, "in manufacturing wrought-iron wheels for railway and other purposes of two disks, connected together at the circumference by a hoop, and at the centre by a tube forming the nave, to both of which the disks are welded."

Secondly, the invention consists "in attaching the tyre to the body of the wheel by means of screws tapped into the body of the wheel."

And, thirdly, "in connecting the two disks of wheels of large dimensions by means of hoops or tubular stays."

Different modifications of the invention are described, the tyre being shrunk on the wheel in all cases before being secured by the screws.

[Printed, 6d. Drawing.]

A.D. 1855, November 10.—N° 2534.

WICKENS, HENRY.—"Improvements in locomotive steam engines, and in apparatus in connection therewith, parts of which improvements are respectively applicable to other steam engines and purposes."

This invention is set forth at considerable length, and embraces various particulars relating to signals and other matters which do not belong to the subject of the present series of abridgments. The only part of the invention which requires notice here relates to the buffers of railway engines and carriages, such buffers being also applicable as stationary buffers. The buffer rods are furnished at their inner ends with pistons which are placed in horizontal cylinders, filled with oil or some other liquid, each of these cylinders "having a valve or valves at the end or beyond the length of the stroke of the piston, and so formed that when the piston is forced in by means of the percussive force of the engine coming in contact with a carriage or other object on the

" railway," or by power applied by the driver or some other person through the medium of a lever handle and screw; "the valve or valves are closed by the pressure of the oil or liquid; and such oil or liquid being then allowed to escape only through a small aperture or apertures in the valve or valves into a closed pipe or pipes, or closed vessel or vessels, a great and gradual resistance is offered, and the effects of the shock thereby greatly diminished; and when the force is removed from the buffer head and the piston is drawn back, and the valve or valves opened by the return action of the oil or liquid and air, and by springs if required, the oil or liquid reflows into the cylinder, ready to be acted upon again." When these buffers are applied to an engine or carriage a rod or arm is connected at one end with the piston rod, and at the other with a lever, and such lever being connected at its other end with a pushing rod to work another lever and the break blocks, the same percussive or other force will also press the break blocks against the peripheries of the wheels to which they are applied, and as the buffer rods are withdrawn by the force of springs or otherwise the break blocks are taken off the wheels." The arrangement of the breaks and their appendages are of the ordinary character, and are not claimed by the patentee taken separately from the buffers.

In the Provisional Specification it is stated that this arrangement of buffer is applicable "for draw bar traction," but no such application is mentioned in the Final Specification.

[Printed, 1s. Drawing.]

A.D. 1855, November 12.—N<sup>o</sup> 2546.

JOHNSON, JOHN HENRY.—(*A communication from Jackson Brothers, Petin, Gaudet, and Company.*)—"Improvements in casting metals."

This invention relates to casting wheel tyres and rims, as well as other articles of an annular form, "by the aid of centrifugal force, whereby the central core hitherto employed for casting such articles is dispensed with, and the work is effected with greater accuracy and economy both of time and labour than by the existing mode of casting objects of this description."

The improvements consist in the employment of a circular chill or mould fitted on to the end of a shaft which is made to rotate at a high velocity, the interior circumference of the chill being



"sliding shoes at the other for railway vehicles," while in "road vehicles" the sliding shoes are connected "with the axletrees" by means of diagonal rods, as before described, with tension rods, having an elastic medium between them."

[Printed, 4d. No Drawings.]

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[Printed, 6d. Drawing.]

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" railway," or by power applied by the driver or some other person through the medium of a lever handle and screw; "the valve or valves are closed by the pressure of the oil or liquid, and such oil or liquid being then allowed to escape only through a small aperture or apertures in the valve or valves into a closed pipe or pipes, or closed vessel or vessels, a great and gradual resistance is offered, and the effects of the shock thereby greatly diminished; and when the force is removed from the buffer head and the piston is drawn back, and the valve or valves opened by the return action of the oil or liquid and air, and by springs if required, the oil or liquid reflows into the cylinder, ready to be acted upon again." When these buffers are applied to an engine or carriage a rod or arm is connected at one end with the piston rod, and at the other with a lever, and such lever being connected at its other end with a pushing rod to work another lever and the break blocks, the same percussive or other force will also press the break blocks against the peripheries of the wheels to which they are applied, and as the buffer rods are withdrawn by the force of springs or otherwise the break blocks are taken off the wheels." The arrangement of the breaks and their appendages are of the ordinary character, and are not claimed by the patentee taken separately from the buffers.

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The improvements consist in the employment of a circular chill or mould fitted on to the end of a shaft which is made to rotate at a high velocity, the interior circumference of the chill being

made to correspond with the design of the article to be cast, the chill for a wheel tyre, for example, being constructed "with an annular cavity in it to form the flange. The metal is poured into the centre or near the centre of the rotating chill or mould, and is immediately driven by the centrifugal force to the circumference, where it is allowed to set or cool. When sufficiently cool the face or top plate of the mould or chill is removed, and the tyre or other article is withdrawn with facility." The moulds may be made "with a flat bottom, the driving spindle being cast on the outside or back thereof," or they may be made with an internal boss and keyed to the end of the driving shaft, the boss in these cases being "made to slope or curve outwards towards the circumference of the mould, so that the metal may the more readily run off from the centre," and the face or top plate in some cases may consist of a ring of sufficient width to keep the metal from being thrown out, such metal being poured in at the central opening of the cover.

"Another form of cover consists of a closed disc having merely a central pouring funnel mouth fitted or cast thereon. When the shaft revolves horizontally the metal must be introduced by a fixed spout or funnel, its lower extremity projecting inside the revolving mould."

This invention may be used not only for the construction of wheel tyres, but also in the formation of "ribbon saws and springs" and other articles, and by cutting the rings thus formed they may be rendered suitable for rolling out into straight lengths or bars, "which may be used for any suitable purpose."

[Printed, 8d. Drawing.]

A.D. 1855, November 17.—No 2596.

SHAW, JOSEPH.—"Improvements in the prevention of accidents arising from collisions on railways."

One part of this invention relates to working the brakes of a railway train, and consists in the employment of a cylinder furnished with a piston, to the rod of which is jointed one end of a lever, mounted upon a fixed fulcrum, the other end of the lever being jointed to a horizontal rod, placed in suitable guides, and in line with another rod mounted below the first carriage of the train, the other carriages of the train being each provided with a similar rod, the ends of each of the rods having catches "affixed thereto for actuating the same, and the brakes connected there-

" with, in any convenient manner upon pressure being exerted  
" therein through the agency of the piston of the cylinder,"  
behind which steam is admitted from the boiler when it is desired  
to apply the brakes; the latter are disengaged by allowing the  
steam to escape from the brake cylinder in any convenient  
manner.

From a small and somewhat imperfect drawing which illustrates  
this part of the invention, the " catches " mentioned above con-  
sist of pieces of metal of conical or triangular figure, but how they  
are to operate upon each other is by no means clear.

The other part of the invention relates to signalling upon  
railways, and is noticed in another series of abridgments.

[Printed, 10d. Drawings.]

A.D. 1855, November 27.—N° 2679. (\* \*)

JOHNSON, JOHN HENRY.—(*A communication from Henri Victor Wacrenier.*)—" Improvements in the manufacture or preparation  
" of india-rubber and gutta percha, and in the applications  
" thereof."

This invention consists in mixing with india-rubber and gutta  
percha calcined shells, or other cheap substance of like nature  
reduced to powder, for the purpose of increasing the volume of  
the material and reducing its cost, and in applying such materials,  
when mixed with sulphur and rendered hard by having been sub-  
jected to a high degree of heat, to the construction of the rollers,  
cylinders, coupling or clutch boxes, spindles, bobbins, reels, and  
spools, bolters, footsteps, collars, and spindle bearings of spinning  
machines; the ratchets and gearing of power looms, the back  
spindles of twisting and doubling machines, and also the bearings  
for the driving and other shafts of machinery in general.

In place of manufacturing the above-named articles of the  
hard india-rubber alone, they may be formed of metal covered  
therewith.

The articles may be made of caoutchouc previously vulcanised  
and reduced to powder, and then moulded in heated moulds.  
These materials, when simply vulcanised, and not rendered hard  
and mixed with calcined shells or other cheap substance, may be  
applied to the manufacture of buffer, draw, and bearing springs  
and similar articles.

[Printed, 4d. No Drawings.]

A.D. 1855, November 28.—N° 2684.

RICHARDSON, GEORGE. — (*A communication.*) — "Improvements in buffer, draw, and bearing springs for railway carriages and waggons."

This invention consists in "the employment of one or more hollow cylinders of vulcanized india-rubber or gutta percha, either separately or in combination with each other, or with other suitable elastic gums or materials, such cylinder or cylinders having a concave circumference, that is to say, the diameter of the cylinders at each extremity is greater than at the middle, by which means the outward bulging of the cylinders when under compression is obviated, and the boxes or cases enclosing them may therefore be made of smaller diameter for the same strength of spring than hitherto, as less space will be filled by the cylinders when under compression than in the ordinary existing india-rubber buffers."

The cylinders (when more than one are used) have metal discs interposed between them, the whole being enclosed in suitable sliding boxes or cases, somewhat similar to those in ordinary use for this class of springs. And this "peculiar concavo-cylindrical form of elastic cylinders" is applicable in constructing both buffer and bearing, as well as draw springs, for railway carriages and waggons, the details of the arrangements in connection with such springs being varied according to circumstances.

[Printed, 6d. Drawing.]

A.D. 1855, December 4.—N° 2726.

FOOT, WILLIAM.—"An instrument for moving and stopping trucks and other carriages on railways."

According to this invention a lever or bar (by preference of wood) has fixed at one end a forked instrument, so constructed as partially to embrace the ring or felloe of a railway wheel when applied thereto, one prong being straight, and coming on one side of the ring or felloe, and the other prong coming on the other side, and being bent inwards at the end so as to be able to lay hold of a part of the inner surface of such ring or felloe. By applying this instrument to the upper part of a wheel and pressing the lever downwards, the truck or carriage to which such wheel belongs, and which may be standing on the rails, will be "moved towards the instrument," while if the fork be applied

to the lower part of such wheel, and the handle be lifted, the carriage will be moved from the instrument, or if in motion, may be stopped by depressing the handle "on to the rail."

The object of the invention is to facilitate the moving of trucks and carriages on railways "when making up trains or otherwise."

[Printed, 6d. Drawing.]

A.D. 1855, December 10.—N° 2784. (\* \*)

PARSONS, DAVID.—"An improved brake for arresting or "retarding at will the motion of locomotive and other engines "and revolving machinery."

This invention is described as being applied to a "winding or "hoisting engine." "To the horizontal framework which supports the shaft on which the fly wheel is keyed, and in a line "with the outer periphery of said wheel, one end of a link or "lever is attached by a pin, the other end of said lever being "connected by another pin to a curved bar of wrought iron lined "with hard wood, the surface whereof is formed of the same "curvature as the periphery of the aforesaid fly wheel; the other "end of said curved bar is connected by a pin to one end of a "short vibrating lever, the fulcrum whereof is in a casting bolted "to a piece of timber fixed crosswise of the framework. There "is a screwed nut or collar attached to the other end of the said "short lever, into which the screwed end of a vertical rod is "fixed; the lower end of said rod being connected by a pin to "one end of a long lever, the fulcrum whereof is so placed with "respect to the weight as to give a power of about twelve to one, "more or less; the longer end of such said lever being connected "by a rod to a piston in a cylinder, into which steam may be "admitted (by a suitable arrangement of hand levers) for imparting motion to the brake; and this mode of operating upon "brakes applies to revolving machinery generally, the parts being "connected together in any convenient manner."

If necessary, the brake may be brought into action by turning a hand wheel and screw connected with the piston of the apparatus.

[Printed, 6d. Drawing.]

A.D. 1855, December 11.—N° 2793.

PRÉAUD, JEAN MARIE.—"Certain improvements in india- "rubber springs."



This invention consists in the use of "round or roundish india-rubber blocks, of like or various forms, but still without either holes or angles, solid or hollow, applied in single or indeterminate number," and such blocks being either composed of india-rubber only, or of india-rubber combined with some other substance.

These blocks "are applicable to any railway or other carriage, to any machine or apparatus, in the character of shock, resistance, traction, suspension, or extension springs." The absence of all boring or perforation of the blocks, and of the rubbing of piston rods passing through them is mentioned as an advantage, inasmuch as the rubbing of such rods is not only destructive of the blocks, but also "partly deprives them of their expansive force," and the suppression of "angles or angular forms" is mentioned as affording "a regular uniform flexion, by dividing equally on each point of the block the tension of its particles."

The particular form, as well as the bulk of the blocks, may be varied according to circumstances, and the india-rubber composing them may be vulcanized or otherwise. The Specification is accompanied by a drawing, representing blocks of various forms, including solid and hollow spherical blocks, solid and hollow ovoids, solid and hollow truncated spherical and ovoid blocks, annular and other forms, but no special mode of applying the blocks is set forth.

[Printed, *od.* Drawing.]

A.D. 1855, December 14.—N<sup>o</sup> 2825.

KRUPP, ALFRED.—"Improvements in railway and other wheels, and in the method of and machinery for manufacturing the same."

This invention consists, firstly, in forming the interior parts of railway and other wheels, together with their naves, "of one piece of solid wrought iron, and without welding." The patentee first forms, "by forging and welding together several pieces or layers of iron, a lump or blank of sufficient diameter and thickness to yield the required disc and nave." These lumps or blanks are then heated in a suitable furnace, and acted upon by a suitable hammer, so as to prepare them for a rolling process, the under side of the hammer, as well as the face of the anvil, being provided with holes corresponding with the size and form of the intended nave, and the blank or lump being turned during the process of

hammering so as to prevent the metal from becoming fixed in the holes. "The metal or blank then takes the form of a plate, "having at or near its centre on each side a projecting lump, "which corresponds to and forms the nave, when the disc is "completed."

A tyre may be united to a disc, such as described above, either by a flange formed in the inside of the tyre, to which the disc is bolted or riveted, "or by a separate ring of angle iron bolted or "rivetted to the disc," and the tyre then shrunk or bolted thereon. The rolls may be of tapering, or of elliptical, or of a volute form, the disc being worked to and fro between them until brought to the desired size and shape, being then afterwards subjected to a hammering process or to hydraulic or other pressure if desirable, in order to "equalize the surface." Discs may thus be formed which may be equal in thickness from the nave to the circumference, or thicker in one part than in another, or of a "corrugated "or undulated form, radiating from the nave to the outer circumference of the disc;" and such discs may either be composed of iron or of steel, or of any other metal or combination of metals capable of being subjected to the process described. One modification of the invention is described in which the disc "gradually inclines from a vertical or other line taken through "the diameter of the disc at the centre," the interior parts of the disc being thus in fact of a "dished" form. The details of the invention are minutely described.

[Printed, 1s. 4d. Drawings.]

A.D. 1855, December 21.—N° 2888.

SAFFROY, JEAN BAPTISTE EMILE.—(*A communication.*)—"An "improved break for railway carriages."

This invention relates to an adaptation of mechanism, in connection with clutch boxes, to operate as breaks upon the axles of the wheels of railway carriages.

"The clutch boxes are arranged in pairs, one on each of two "supporting axles of the carriage, and one part of each clutch "box is fixed to the axle, whilst the other of each is capable of "sliding thereon, and has formed upon or fixed to it two pulleys or "wheels, one larger than the other. These pulleys or wheels of "the sliding part of the clutch box to one axle are connected to "the like parts of the clutch box of the other axle by chains, one "end of each of which is connected to the larger pulley or wheel

" of the loose part of the clutch box to one axle, and the other  
 " end to the smaller pulley or wheel of the clutch box of the other  
 " axle."

The sliding of the moveable parts of the clutch boxes to and fro is effected by suitable gearing, that employed by the patentee consisting of "a winch or crank handle, upon an axle communicating by pinions with another axle or shaft carrying toothed segments or wheels, taking into racks attached to a main bar embracing the sliding part of each clutch box," and the result of the whole arrangement is that on the clutch boxes being thrown into gear, the progressive motion of the carriage will "cause a winding of the chain on to the larger pulleys," by which the rotation of the axles and wheels will be stopped, the latter sliding upon the rails until the momentum of the carriage is overcome.

The details of the invention are minutely set forth, and include the use of springs to assist in keeping the parts of the clutch boxes together when placed in gear, and also of "compound hinged links," for connecting the shaft for actuating the sliding clutches of one carriage with that of another, so that the clutches of a number of carriages may be placed in gear simultaneously. These details may, however, be varied.

[Printed, 1s. Drawings.]

A.D. 1855, December 21.—N<sup>o</sup> 2897. (\* \*)

GLOVER, CHARLES.—"Removing snow from a line of railways."

This invention consists of constructing and applying a carriage on flanged wheels, suitable for running on a railway. The carriage is framed strongly together, and the fore part is constructed somewhat similarly to an ordinary plough. There is a horizontal cutting edge of a length somewhat greater than the space between the rails, in order that the snow may be removed not only from the over space between rails, but also on either side of the two rails; there is also an upright cutter in the nature of a coulter, and a mould board. The two cutters divide the snow horizontally and vertically, and the mould board turns over the snow at a distance from the rails.

[Printed, 6d. Drawings.]

A.D. 1855, December 26.—N<sup>o</sup> 2918.

TOLHAUSEN, ALEXANDRE.—(*A communication from G. W. and T. C. Geisendorff.*)—"Certain improvements in axle boxes."

According to the first of these improvements the flange usually cast to the front and upper edge of the axle box for the purpose "of holding the wedge and bearing to their places" is dispensed with, and an opening made in the top of the box through which a loose lug is dropped, which answers that purpose, this lug being capable of easy removal, and not only affording facility for the removal of the bearing and wedge, but also being made to project down in front of the axle, and "and relieve the ends of the bearing from the wear caused by the collar of the axle in its longitudinal motion caused by the lateral vibrations of the cars."

Another part of the invention consists in furnishing the axle box with a flange and stuffing box in which rings of leather are placed, this arrangement preventing "the entrance of dust or the escape of oil."

Thirdly, the invention consists in the employment of a semi-circular spring which is attached to the inside of the axle box, and so contrived and arranged as to prevent "the collection of oil on the back collar of the axle," and the waste which would arise from oil in that case "soaking through the leather packing at the end of the box."

Fourthly, in providing the lubricating roller with a number of recesses under the felt with which it is covered, these recesses becoming filled with oil, and serving, in case of the accidental escape of the oil from the box, "to lubricate the axle until examined by the attendant."

Fifthly, in providing the frame in which the lubricating roller works with a screw and spiral spring, through the medium of which the roller is pressed up against the axle, the spring being so arranged as to yield in case of accident to certain gearing by which the roller is driven, and so prevent injury to or interruption of the motion of the roller. The application of this gearing constitutes the last part of the invention. This gearing consists of a pinion connected to the end of the axle and acting upon a wheel placed on the axis of the roller, the roller thus receiving a "positive motion" instead of being merely driven by frictional contact with the axle, and the patentee stating that the lubricating material will thus be always applied freely and with certainty to the axle, whether the lubricating material be in a fluid state, or "rendered solid by the state of the weather or at the moment of starting the cars after a long rest." This part of the inven-

tion is mentioned as being more particularly applicable when "dubbing" is used, this being a mixture of tallow and oil.

[Printed, 1s. Drawing.]

A.D. 1855, December 28.—N° 2934.

ROBINSON, JOHN, CUNLIFFE, RICHARD, and COLLET, JOSEPH ANTHONY. — "Improvements in locomotive steam engines, and in springs for locomotive steam engines, and other purposes."

One part only of this invention requires notice here, this consisting "in constructing springs for locomotive engines and other purposes of concave steel disks, with a hole in the centre, and radiating openings extending from the centre hole towards the circumference." A mode of applying these springs to a buffer is described, in which two of the concave disks are placed with the edges together in a box or cylinder to which the buffer head is attached, this box being capable of sliding to and fro for a short distance in a second box, which is bolted to the buffer beam, and in which is a third concave disk with its convex side opposed to the convex side of one of the other disks, the result being that on the buffer head and first box being driven inwards the slots in the disks allow them to yield thereto, their elasticity causing them to return to their first form on the pressure being removed from them. A central bar, projecting from the buffer beam, passes through and keeps the disks in position. An application of these disks in forming a bearing spring is also described, in which two disks only are used, these being placed in a suitable case or box, with the convex sides in contact, the tension of the spring thus formed being regulated by means of a set screw, and a plate resting upon the upper disk. Such disks may be also applied as springs for draw bars.

These improved springs may also be composed of several wedge-shaped steel plates, connected by rivets or otherwise to a hoop, and bent into a concave form. "By this means, if a portion of the spring is fractured, a fresh piece may be substituted for the fractured one, thereby facilitating repairs."

[Printed, 1s. 2d. Drawings.]

1856.

A.D. 1856, January 3.—N° 14.

**HAINES, FREDERICK.**—“The deadening of sound, and the  
“prevention of vibration and concussion in connection with  
“machinery, gun and mortar boats, and general ordnance, and  
“other purposes.”

This invention consists “in the application of cork in various  
“forms and for various purposes for which it has not been  
“hitherto generally applied.” The invention is described as  
being adapted to a number of purposes. In one case a block of  
cork, of any necessary thickness and form, is applied between  
the spring and the bed of a railway or other carriage, in conjunc-  
tion with layers of woollen or other fibrous material, secured by  
means of an iron plate or straps of iron or other metal, “thereby  
“preventing, when a railway or other carriage is heavily laden,  
“the thumping and jolting motion between the spring and bed  
“of the carriage.” The patentee also uses a ring or rings of  
cork, in connection with woollen or other fibrous material, be-  
tween the buffer rod plate and spring of a railway carriage, thus  
easing and assisting the spring when the carriage is on the point  
of stopping. For the journals or boxes of railway and other  
carriages he uses a ring or collar of cork, to prevent the grease or  
other lubricating material employed therein from escaping be-  
tween the arm of the axle and the collar of the wheel. “The  
“great desideratum of the cork collar is that in cases where the  
“journal becomes heated the cork collar is not liable to become  
“charred or fixed, as is the case of those at present in use,”  
such a collar being, moreover, less costly. “These collars, of the  
“necessary form, may be applied to axles of vehicles of all  
“descriptions,” and the doors and door frames of railway and  
other carriages may be partially lined with cork, which will pre-  
vent the “unpleasant slamming” often experienced on the sudden  
closing of such doors.

The patentee mentions the invention as being applicable to the  
collars of lathes and other machinery, to the shoeing of horses  
and other cattle, also to saddle trees, horse collars, splints for  
surgical purposes, flower pots, the floors of warehouses, and other  
uses, stating also that for some purposes it is necessary that the  
cork should be in some way prepared, being, for example, com-



pressed before being applied to railway and other carriages, as described above.

[Printed, 4d. No Drawings.]

A.D. 1856, January 3.—N<sup>o</sup> 26.

LACKERSTEEN, JAMES FREDERICK.—“Improvements in the  
“prevention of collisions on railways.”

The invention consists in “laying down pipes along a line of  
“railway to contain water, which, to prevent freezing, contains a  
“solution of salt. At the end of each pipe is a piston or instru-  
“ment in connection with an incline, which, being pressed down  
“or moved by an instrument on the locomotive or other carriage  
“of a passing train, displaces the water and drives it to the other  
“end of the pipe, where it acts on a piston or instrument also  
“connected with an incline. The apparatus will, after being  
“acted on at one end, remain in position till the train passes  
“over the other end of the pipe, and acts on the incline at that  
“end which will cause the water to be driven back in the pipe,  
“and at the same time, by acting on the piston or instrument at  
“that end, put the incline at the first mentioned end in a con-  
“dition to be again similarly acted on by the next train. In  
“addition to the inclines or other suitable instruments to be acted  
“on by the passing trains, there is at each end of a pipe another  
“instrument which is moved into position to come in contact  
“with an instrument (in connection with the throttle valve of  
“the locomotive engine) in such manner as to cut off the steam  
“from the engine of a train, and also, if desired, to put on the  
“brakes.” By these means “and by having such pipes of two,  
“three, or more miles in length, a second train passing over the  
“same line of railway will, by the apparatus, have the steam  
“cut off from the engine, unless the previous train has passed  
“over or arrived at a distance of two, three, or more miles,  
“according to the length of the pipes used. By similar arrange-  
“ments in connection with the same apparatus one train is  
“prevented from coming against another train from opposite  
“directions on the same line of rails.”

Different modifications of the invention are set forth, various  
arrangements of levers, plungers, inclines, and other mechanism  
being applied as may seem desirable, a “steam brake” being  
used in some cases for the stoppage of a train, the steam being  
applied to the brakes through the medium of cylinders and

pistons to which the steam is admitted on being shut off from the cylinders of the engine.

[Printed, 1s. 4d. Drawings.]

A.D. 1856, January 9.—N° 68.

JEANNE, VICTOR, MARTIN, ADOLPHE, and MARTIN, MICHAEL EDMOND.—(*Provisional protection only.*)—"An improved grease box for axles, journals, and other rotary parts of machinery."

The inventors mention in the first place that the great speed given to the rolling stock of railways "soon imparts to the axle journals a temperature such as to liquefy the grease, and to make it escape without producing any working power;" the heat being even often so great as to ignite it. They then state that the object of this invention is to do away with these defects; by modifying somewhat the construction of the grease boxes, and by using water in sufficient quantity for cooling the said pieces. The said modifications are little expensive, since they consist of a water tank that may be adapted beneath a seat, &c., and a pipe, one part of which is formed of metal and one of caoutchouc, connecting the said reservoir with the lower part of the grease box. A cock is secured to the pipe, allowing to regulate the passage of the water according to exigencies," another cock being "adapted at the lower part of the grease box to empty it completely as often as required."

[Printed, 4d. No Drawings.]

A.D. 1856, January 11.—N° 83.

JOHNSON, JOHN HENRY.—(*A communication from Jean Baptiste Marie Albert Cockot.*)—(*Provisional protection only.*)—"Improvements in railway breaks."

According to this invention, railway vehicles "are lifted entirely off the rails" when it is necessary to retard or stop their motion, "and rest with the whole of their weight upon suitable shoes or skids, which are brought instantaneously into contact with the rails at every carriage throughout the entire length of the train, if desired."

According to one arrangement, "each or any desired number of carriages is fitted with four shoes or skids, placed each in front of the wheels of the carriage. These shoes are connected to lever arms, which have a slight vertical play at their upper

"ends, in sockets, formed in two shafts" working in bearings beneath the framing, one shaft being near each end of the carriage, the object of the "vertical play" being to compensate for the varying height of the framing from the rails, produced by variations in the number of passengers in the carriage. Each pair of skids are connected by a transverse bar, and the back and front pair by a longitudinal rod, and one or two links of a chain, "so that their coupling may be adjusted;" and the front pair are moreover connected, by means of a lever and vertical rod, to a hook placed on "a horizontal longitudinal actuating shaft, working in bearings on the roof of the carriage," and by slightly turning this rod, by means of a winch, the hook is disengaged from the rod, the arrangement being such that on this being done the skids descend upon the rails, "and the wheels will be raised from off the rails and run upon the skids."

According to another arrangement, only one lever arm is used for connecting each pair of skids to the transverse shaft, such arm being forked at the lower end, and bolted to the transverse bar which connects the skids of each pair. In this case, in place of the arm having a vertical play through a socket in the shaft, the shaft itself is made to work at its bearings in vertical guide slots.

[Printed, 4d. No Drawings.]

A.D. 1856, January 11.—N<sup>o</sup> 86.

POLE, WILLIAM, and KITSON, FREDERICK WILLIAM.—  
"Improvements in railway wheels."

This invention relates to an improved method of securing the tyre to the rim, felloe, or body of a railway wheel, "the object being to permit of the tyre wearing away by continued use, without detriment to the fastenings which secure it to the rim." For this purpose, instead of fastening the tyre to the rim or felloe by means of screw bolts placed in the middle or "head" of the tyre, as usually practised, the patentees "secure it at or near its two edges, namely, by means of a dovetail or undercut lap joint at one edge, and by screws at the other edge; or by screws at the two opposite edges," the tyre in the latter case not overlapping or being broader than the rim.

Various modes of carrying the invention into effect are described, the screws, however, in all cases being inserted from the interior of the rim, and in some cases these screws passing through snugs

or ears formed upon the rim or felloe, "and projecting from it to "such an extent as may be necessary to bring the screw near to "the edge of the tyre." In the case of a rim being much narrower than the tyre, the screws may be outside the former, the heads only of the screws being against it. Or the screws may incline inwards, passing through the rim into the tyre. When projections or snugs are used, they may be formed during the process of rolling the bar intended to form the rim, or they may be produced by other means.

[Printed, 10d. Drawing.]

A.D. 1856, January 12.—N° 93.

OWEN, WILLIAM.—"Improvements in the manufacture of "railway wheels and tyres."

This invention consists, firstly, "in certain arrangements of "bell clutch and rolling machinery, for getting both the inside "and outside surfaces of tyres true before being shrunk on to "their wheels;" and, secondly, in arrangements of machinery "for finishing tyres when on their wheels, and in a heated state, "by rollers," the patentee stating that he thus preserves the outer skin of the tyre, and improves the metal by the pressure it receives from the rollers.

The tyre, being heated, is placed upon a wheel, "in the ordinary manner for shrinking," and both wheel and tyre are then removed to a lathe, or a machine acting in a similar manner to a lathe, this machine being fitted with suitable rollers placed either horizontally, vertically, or otherwise, the tyre being then rolled while still in a heated state upon the wheel. Water, or not, may be applied during the cooling if desirable, and the wheel and tyre may be acted upon "either in a horizontal or vertical position;" the outer surface of the wheel being in some cases rolled before the tyre is placed upon it, in order to render the turning of such surface unnecessary.

The details of the mechanism employed in carrying out the invention are minutely described, and illustrated by twelve sheets of elaborate drawings, which it will be necessary to inspect in order fully to understand these details. The arrangements include the employment of expanding or other supports to the felloes of railway wheels, between the spokes thereof, during the rolling of the same, and during the shrinking or the rolling of the tyre upon them, or during both, in order to preserve the true

form of the periphery of the wheel. Also a method of rolling the edges of the tyres of railway wheels by means of rolls mounted on each side thereof, and acting simultaneously with the rolls which operate upon the other parts. Also the rolling of tyres, "when off their wheels," upon an expanding or other mandril or frame; the rolling of tyres when off their wheels on the inside, and against an outside curb ring or support; the rolling of tyres either on their wheels or upon mandrils or frames, by holding the tyres at rest, and causing the tyres to travel round them, or by causing both of them to revolve at different speeds, or in contrary directions; and, rolling the outer surfaces of railway wheels in place of turning them before the tyres are shrunk upon them, as alluded to above.

[Printed, &c. Drawings.]

A.D. 1856, January 14.—N° 102.

CHAMBERS, AUSTEN, and CHAMPION, WILLIAM HARRISON.—"An improved mode of working railway breaks."

This invention "has for its object to make use, when required, of the momentum of the carriages, as a power whereby the break blocks are pressed upon the wheels," and also "to provide self-acting means, whereby the wear of the break blocks is taken up or allowed for, without subjecting the various parts of the apparatus to undue strain or pressure by the farther collapse of the train after the break blocks have come into contact with the wheels." The patentees "connect each pair of buffer rods together by means of a suitable metallic bar," to which they joint "a rod or piece of metal, having an incline or wedge formed upon its inner end; this incline passes between a roller upon which it rests (and which is supported from the carriage framing), and another roller attached to the upper end of two vertical links, with which it is free to move in a vertical direction when the incline or wedge is pushed inwards. The lower end of these links carry a pin, which passes through vertical slots formed in the ends of two levers, which are loose on a transverse shaft, and are maintained from falling below a horizontal position by chains attached to the framing. To this shaft are attached segments of ratchet wheels, actuated by clicks or palls carried by the levers. When it is necessary that the breaks should remain unaffected by the collapse of the

“ train (as in backing or shunting), the pin travels freely up and  
 “ down in the vertical slots, before mentioned, without acting on  
 “ the levers, but when the collapse of the train (by reason of the  
 “ application of the tender, break, or otherwise) is required to  
 “ apply the self-acting breaks,” a certain arrangement of mechanism enables the guard or engine driver, by means of a cord connected with the apparatus, to produce a change in the position of the links, “ and cause the pin to raise the levers,  
 “ which, by their clicks or palls, act on the segments of ratchet  
 “ wheels fixed on the transverse shaft, from which the motion is  
 “ communicated by levers and connecting rods to the sliding  
 “ break blocks, which are thereby pressed against the wheels.  
 “ In connection with the break blocks is a self-acting arrangement, whereby they are prevented from moving more than a  
 “ limited distance from the peripheries of the wheels, and the  
 “ wear is also allowed for,” this arrangement consisting essentially of clicks and ratchet racks.

The details of the invention may be variously arranged.

[Printed, 10d. Drawing.]

A.D. 1856, January 17.—N<sup>o</sup> 123.

FONTAINEMOREAU, PETER ARMAND LE COMTE DE.—  
 (A communication).—“ An improved apparatus for the prevention  
 “ of accidents or collisions on railways.”

This invention consists in the employment of an excentric “ or  
 “ any other arrangement of mechanism producing similar effects,  
 “ fixed to one of the axles” of a railway train, “ which in connection with a paul and ratchet wheel, is made to put in action  
 “ the breaks to any number of carriages, and thus enable the  
 “ train to be stopped when necessary.”

“ To put the breaks in action, a paul is constantly worked by  
 “ the said excentric, which at the moment of danger, or whenever  
 “ it is desirable to stop the train,” “ is put in gear with a ratchet  
 “ wheel, fixed on a shaft, with levers and connecting rods for  
 “ giving the requisite motion to the breaks. The ratchet wheel  
 “ is provided with such a number of teeth as requisite for giving  
 “ motion to the breaks. The excentric takes up only one tooth  
 “ at each revolution, and the ratchet wheel is successively maintained in its required position by means of a friction break,  
 “ acted on by a knee lever. The paul, after having taken up all



" the teeth on the ratchet wheel, may continue to work without giving any further motion to the ratchet wheel or pressure to the breaks, and thus the pressure of the breaks is controlled, notwithstanding the number of revolutions of the excentric or the motion of the train. The paul is put in gear with the ratchet wheel by the motion of a horizontal shaft, which is fixed longitudinally to the frame of the carriage, and the said horizontal shaft is provided with suitable couplings, so that whenever it is desirable to use the breaks on several carriages the horizontal shafts may be coupled together, and thus, by means of one lever only, placed in a convenient position for working by the guard or engine-man, the several motions required may be transmitted for putting in gear all the pauls with the ratchet wheels. It is further evident that the construction of this mechanism will depend on the form or nature of the carriages."

The details of the invention are very clearly set forth.

[Printed, 10d. Drawing.]

A.D. 1856, January 18.—N<sup>o</sup> 140. (\* \*)

MYERS, EDWARD. — (*Provisional protection only.*) — "Improvements in buffers and other springs for railway and other carriages."

It consists in "fitting two or more series of annular vulcanized caoutchouc springs, in a suitable spring box or casing, each set of springs being placed in a separate and distinct compartment of its own, such compartments being concentrically arranged, so that the inner set of springs will be of smaller diameter than the outer ones. The inner end of the buffer rod, or other portion receiving the shocks, has a number of circular projections formed on it, or fitted thereto, such projections corresponding to and fitting into the chambers containing the different sets of springs. The springs in each set are arranged in gradually increasing or decreasing numbers, so that the buffer, if applied thereto, will first be brought in contact only with one set of springs, and then with a second set, and so on, thus meeting with greater resistance the further it is pushed inwards, by which means the shocks of the buffers will be more gradually deadened than by existing arrangements."

[Printed, 4d. No Drawings.]

A.D. 1856, January 28.—N° 224.

**JULLIENNE, AUGUSTIN MAGLOIRE.**—(*Provisional protection only.*)—"Improvements in brakes for railway trains."

In this invention brake blocks are suspended from the framing of a locomotive or tender or carriage, one block being on each side of each wheel, and connected by means of links with an arrangement of horizontal bars and an upright lever, the upper end of the latter being jointed to a rod, attached to the rod of a piston, which is placed in a cylinder fixed horizontally beneath the framing of such locomotive, tender, or waggon. A pipe is arranged so as to form a communication between the boiler of the locomotive and the cylinder, and by opening a cock in this pipe, the engineer can at any time cause a supply of steam to enter the cylinder, between the piston and what is called the bottom of the cylinder, the result being that the piston, with its rod, and the rod connected thereto as mentioned above, are so moved as to cause the upright lever and the apparatus combined therewith to press the brake blocks against the wheels. The invention also includes the employment of an adjustable "stand," which can be placed near the rails in any convenient situation, and made to act upon a lever carried by the locomotive, tender, or waggon, so as to open the steam cock and bring the brakes into operation without the aid of the engineer.

[Printed, &c. Drawing.]

A.D. 1856, January 28.—N° 227.

**GUÉRINOT, PIERRE EMMANUEL.**—"Stopping instantaneously "two railway trains running against each other."

This invention consists in placing at or near one side of the framing of each engine and carriage of a railway train a sharp hardened pointed rod, the point of such rod being "turned of a "regular, smooth, tapered, or conical shape," and the rod being secured to the framing of the engine or carriage by a suitable collar and nut. At or near the opposite side of each engine and carriage is fixed a block of lead, the arrangement being such that in case of two trains coming into collision the pointed rod of each engine will be driven into the lead block of the other, causing the stoppage of the respective trains, the carriages connected with such engines being prevented from coming into violent collision

with each other by the pointed rods attached to one carriage coming into contact with the lead blocks of the next.

The details of the invention may be varied, in some cases the pointed rods being mounted in bearings in which they are capable of sliding to-and-fro, and being furnished with heads resembling those of buffers, the arrangement being such that the different rods come into action successively upon the blocks, being made of different lengths for that purpose.

[Printed, 10d. Drawings.]

A.D. 1856, January 31.—N° 264.

TURTON, THOMAS BURDETT, and ROOT, JOHN.—“Improve-  
ment in buffer, bearing, and draw springs.”

This invention consists in applying, for buffer, bearing, and draw springs, “a combination of the helical or spiral spring with screw inclines, so arranged that the elastic force of the spring is taken advantage of, both in the direction of its axis and round its axis.” The patentees state that the best mode of carrying out the invention with which they are acquainted, consists in the use of two cylinders, “having formed on them screw inclines in such manner as will cause one or both of them to revolve when made to approach the other. The spiral or helical spring surrounds these cylinders, one end being secured to one of them, and the other end to the other. With this arrangement, both movements of the cylinder (rectilinear and rotatory) are resisted by the elastic force of the spring, and thus advantage is taken of its elasticity, both in the direction of its axis and round its axis.” One of the cylinders may be fixed, the other being moveable, and having formed upon or attached to it “a part corresponding to and answering the purpose of the slide bar of ordinary buffers and draw springs, or the spindle of bearing springs;” the patentees describing in detail, with the aid of a drawing annexed to the Specification, various applications of the invention to both railway carriages and engines.

[Printed, 10d. Drawing.]

A.D. 1856, February 2.—N° 291.

NAPIER, GEORGE.—(*Provisional protection only.*)—“Improve-  
ments in ‘breaks’ for railway & other carriages.”

As regards railway carriages, this invention consists in an arrangement of breaks, which are brought into operation by the

action of the buffers. . The breaks consist of segments of suitable material, suspended from the framing, links connecting the lower ends of these segments to the buffer heads, the result being that on the latter being pressed inwards, the segments are forced against the wheels of the carriages. In order to provide against the action of the breaks when it is necessary to back a train, stops are placed between the buffer heads and the framing of the carriages, which stops "may either be dropped in or removed " singly by hand, or by rope or rod communications, under the " command of the engine driver."

As regards carriages for common roads, the invention consists of applying a break to either one or both of the hind wheels of such a carriage, such break or breaks being supported from an arm mounted on a cross shaft, on which shaft is also a lever, connected with a long rod which is carried forward under the pole and attached to a sliding piece mounted on the end of such pole. The chains or straps or other connections between the horses' collars and the pole, instead of being fixed thereto, are carried over two sheaves or pulleys, and back to the sliding piece on the pole. When the horses are pulled up they strain upon the chain or strap of the collar, this drawing forward the sliding piece and rod connected thereto, and applying the break apparatus to the wheel or wheels. The rod is jointed so as to admit of the action of the front axle, and parts connected therewith, in turning the vehicle, and a stop is provided, which may be so moved by the foot of the driver as to prevent any movement of the rod and break apparatus when the carriage is being backed.

[Printed, 4d. No Drawings.]

A.D. 1856, February 6.—N° 323. (\* \*)

JOWETT, HENRY ALFRED.—(*Provisional protection only.*)—  
"Improvements in railway breaks and carriages, and in signals  
"connected therewith."

The inventor proposes to compress air into a strong vessel by means of an air pump worked by the axle of the carriages. This air, so compressed, he uses to sound a whistle, and also by means of a cylinder and piston to press the wood blocks of the railway breaks against the tyres of the wheels.

[Printed, 4d. No Drawings.]

A.D. 1856, February 13.—N° 366.

FOX, SAMUEL.—“Improvements in springs for railway and  
“other carriages.”

This invention consists in “applying corrugated steel plates in  
“constructing springs, in place of the flat or tapering plates of  
“steel now used, by which lighter springs may be constructed  
“for supporting a given weight.”

These corrugated plates are superposed one upon another, and  
mounted in the ordinary manner.

[Printed, 6d. Drawing.]

A.D. 1856, February 13.—N° 371. (\* \*)

NEWTON, ALFRED VINCENT.—(*A communication.*)—“Improve-  
“ments in springs applicable to railroad carriages, and to other  
“uses.” These are, “making volute springs (which are wound  
“or coiled up with the coils close to sustain each other, as the  
“force is applied in a direction parallel with the axis) of bars of  
“steel, tapering in width from the outer to the inner coil, when  
“the said springs are so coiled that the upper edge of all the  
“coils is on the same plane, and the lower edge of the several  
“coils is in the line of a spiral,” and also “combining with such  
“a coiled spring a conical frustum of vulcanized india-rubber or  
“caoutchouc placed within the conical cavity formed by the  
“spiral line of the lower edge of the coils,” “that the inner coils  
“may be made sufficiently sensitive to yield to slight forces and  
“be aided in resisting great forces by the gradually increasing  
“tensive force of the india-rubber as it is compressed by the  
“successive coils coming in contact with it.”

[Printed, 6d. Drawing.]

A.D. 1856, February 16.—N° 402.

HARRISON, GEORGE.—“Improvements in axles for railway  
“carriages.”

This invention relates to the construction of “divided or com-  
“pound railway axles.” According to one mode of carrying out  
the invention the patentee forms the inner end of each separate  
axle “with a collar, and when these two collars are brought  
“together and the axles placed in a line with each other they are

" held in that position by wrought-iron caps and steps, each  
" formed in two parts, the steps corresponding in shape to that  
" part of the axle which they are intended to embrace and sur-  
" round, so that when the aforesaid caps and steps are screwed  
" together each axle shall be at liberty to rotate independently of  
" the other one, and still the two shall be connected together  
" firmly."

Another mode of carrying out the invention consists in connecting the ends of the axles together "by a 'he' and 'she' joint," and employing, in place of the caps mentioned above, "a solid wrought-iron box made round, and bored and fitted up to receive inner boxes or stops of brass or iron, which are connected to the outer box by two screws to each step."

"When it is desired to afford additional security to the axle" the two portions of which it consists may be made hollow, and a wrought-iron tie-rod or bolt be passed through them, and secured in its place by a head at one end and a nut at the other.

[Printed, &c. Drawing.]

A.D. 1856, February 20.—N° 434.

JOHNSON, JOHN HENRY.—(*A communication from Eugene Bourdon.*)—"Improvements in machinery or apparatus for lubricating bearings, parts of which improvements are applicable to the raising or elevating of liquids."

Before describing this invention the patentee mentions that among the arrangements which have been employed for the lubrication of axles and journals, a revolving disc has been used, such disc dipping into an oil reservoir at its lower part, and taking up with it in its rotation a certain amount of oil, which, on arriving at the top of the disc, is allowed to pass on to the part to be lubricated. He states, however, that in the ordinary arrangement of such a disc the lubrication of such parts is very imperfectly executed, and that according to the present invention a lubricating disc of metal or other suitable material is fixed on to one or both ends of the journal to be lubricated, outside the bearings thereof, such disc rotating with its lower portion in an oil reservoir, a small "oil collector, in the form of a lipped scraper" resting upon or being nearly in contact with the upper part of the disc. This collector may be made in the form of a thin spring blade, secured to the inner side of a cap which covers the oil reservoirs, and so protect the oil from dust or other



foreign matter. The top of the scraper directs the oil to the journal, over which it passes and descends into the reservoir, to be again elevated. The collector may have a lip on each side, this being mentioned as specially applicable when the invention is adapted to railway axles, in order to prevent the oil from being shaken out at the back of the axle box, securing the lubrication not only of the journal, but of the end abutment piece or tightening wedge. This arrangement may be varied by keeping the disc in actual contact with the end of the brass, which will then answer as the oil collector, whilst a portion of the oil is brought into contact with a vertical pin, from which it drops between the end of the abutment piece and the end of the journal, a small door in front of the axle admitting of the inspection of the oil.

The invention is described under various modifications, some of these being adapted to horizontal shafts or axles, while others are more specially applicable to oblique and upright shafts. Others, again, are adapted for the crank pins of steam engines, the screw shafts of marine steam engines, and like purposes. When the collector has a lip on each side it acts as a distributing spout, and a disc may be combined therewith having therein annular grooves or channels, this arrangement being more especially applicable in cases in which the disc is required to revolve at a high speed, the distributing spout being made with projections which fit into such grooves or channels, and the lubricating material being thus prevented from being "thrown off by the centrifugal force."

[Printed, 1s. 4d. Drawings.]

A.D. 1856, March 6.—N<sup>o</sup> 560.

SHARP, THOMAS BEATT, and FORSYTH, THOMAS. — (*Provisional protection only.*) — "Improvements in coupling railway stock."

This invention consists "in coupling railway stock by means of self-adjusting draw hooks, the object being to economise the power hitherto lost when the line of traction is not laterally and horizontally true. When the points of attachment of two contiguous carriages, coupled in the ordinary manner, are not in the same horizontal plane, it is evident that a portion of the power exerted to propel the carriages is absorbed in raising one

" and depressing the other, and when the points of attachment are not laterally true with the line of traction a portion of the power is absorbed by the carriage assuming a diagonal direction with respect to the rails, and thereby bringing the flanges of the wheels in contact with the rails." The inventors state that one mode of constructing their self-adjusting draw hooks "is by attaching a washer to the end of the draw hook, which hook passes through a hole of sufficient size to allow for the requisite play made in a plate attached to the buffer beam," and they do not describe any other mode.

[Printed, 4d. No Drawings.]

A.D. 1856, March 11.—N° 589.

GREENE, HENRY. — (*A communication.*). — (*Provisional protection only.*) — "Improvements in locomotive engines and carriages running on railways."

One part of this invention consists in arranging the machinery, cylinders, and other working parts of the engine upon one frame, and upon another frame, distinct from the former, but coupled thereto, the boiler or boilers, connection being made between the cylinders and the boiler or boilers by suitable pipes and universal joints, similar means of communication being provided between the cylinders and the chimney for the escape of exhaust steam. The inventor mentions, however, that he does not confine himself to the use of two frames, but reserves the right to have the machinery and boiler or boilers upon one frame, but so as to be "quite distinct," the boiler to be placed either in front of or behind the engines or motive machinery. The upper part of the framing of the engine or working end of the machine is to be covered with plates of iron, forming a platform and coke space, suitable trap doors being left, where necessary, for access to the working parts of the engine, tanks surrounding this platform carrying water for the boiler, and also forming a bulwark around the platform.

Where the framing is in two parts the inventor proposes to use four or six bearing wheels under each frame, or six or eight bearing wheels when a single frame is employed. He also proposes to have each wheel fixed upon a separate short axle, the sides of the framing being so arranged as to admit of a bearing being placed at each end of each axle, the side frames being, in fact, double, and the wheels working between them, such frames

being composed of wrought-iron plates or of wooden beams plated with wrought iron; and the inventor states that should "a sufficient benefit arise" he proposes to apply "a similar improvement to the main or crank shaft of the engine, by substituting for the two large cylinders at present in use with the continuous crank shaft four smaller ones, placed back to back, and working on a crank pin fixed in the boss of each wheel, the ends of this short crank shaft to be supported similarly to the other supporting axles of the engine and boiler."

The invention relates to certain other particulars, which do not, however, require notice here.

[Printed, 4d. No Drawings.]

A.D. 1856, March 12.—N<sup>o</sup> 593.

HORNER, HENRY, and BAGLEY, RICHARD.—"Improvements in buffers and draw and bearing springs for railway and other purposes."

This invention is designed to prevent "injury to passengers and property" and also to railway carriages, trucks, and engines, from the effects of sudden concussions. "This great object is effected in a more economical, convenient, and effective manner than has hitherto been accomplished, as follows, viz., by means of a compound helical or spiral and conical metallic spring made of round, square, flat, or oval steel or other metallic substance," and formed "by twisting or coiling one end of the said round, square, flat, or oval steel into a parallel spiral, returning the other end back inside to a conical or helical form, to any distances circumstances may require, which said compound or double spring is placed into a metallic cylindrical case or box, in which works freely (after the form of a telescope) a compound or double hollow plunger or ram, the outer and longer coils of the said spring filling the whole length of the box and plunger, the inner and shorter coil of the said spring only occupying part of the space between the end of the inner plunger and bottom of the metal box or case."

The details of the invention may be variously modified, and the invention may be applied not only to buffer but also to draw and bearing springs, as well as to springs for other purposes.

[Printed, 6d. Drawing.]

A.D. 1856, March 12.—N° 600. (\* \*)

CORBITT, WILLIAM, and SHAW, GEORGE.—(*Provisional protection only.*) — “Improvements in buffer, bearing, and draw “ springs for railway and other carriages.” When metallic elliptic springs are employed, placing them “in a box or case “ singly, and not on each other, in a succession of plates, as in “ the ordinary springs; and in the interior of the case are made “ slides or grooves for the plunger to work in, by which the “ bearing is increased in proportion to the action of the buffer or “ spring. At or near the centre of the springs, where they touch “ each other, are placed india-rubber rings, so that when in action “ and driven home, the india-rubber, being in the interior of the “ springs, will prevent them from coming in contact with each “ other, and will present an additional resisting force by its “ elasticity, and along with the proper adjustment of the length “ of plunger, the extreme weight or pressure is taken off the case “ and spring, and prevents them being broken in concussion.”

[Printed, &c. No Drawings.]

A.D. 1856, March 12.—N° 601.

EDWARDS, FREDERIC HOWORTH. — (*Provisional protection only.*) — “Improvements in railway brakes.”

According to this invention each carriage in a train has attached to its central part, beneath the framing, a short horizontal cylinder to receive two pistons, these being either of the common kind or composed of “two metal disc plates, embracing a flexible cupped “ or dished packing piece fitted to the cylinder.” The cylinder has a stuffing box at each end, and the rods of the two pistons pass respectively fore and aft, through the two stuffing boxes, far enough to reach the two axles of the carriage, and each is finally connected to “a duplex knee-joint link arrangement or parallelogram of links on the ‘lazy-tongs’ plan, working in a slotted “ bracket attached to the framing, and connected with a pair of “ clipping wood blocks, which embrace the running axle of the “ carriage wheels. The inward traverse of the pistons thus causes “ the fore and aft pairs of brake blocks to clip more or less “ severely upon the axle, so as to retard the train in proportion “ to the quantity of steam admitted to the cylinders. Various “ other mechanical arrangements may be adopted for giving the “ necessary brake action. The pressure cylinders are connected

" with each other and with the locomotive boiler by flexible tubing, the joint connections of the tubing being made by turning the ends over ferrules, and then screwing these parts together," these arrangements thus admitting of the brake blocks being drawn into simultaneous action "throughout the train."

[Printed, 4d. No Drawings.]

A.D. 1856, March 12.—N<sup>o</sup> 604.

MURRAY, GEORGE.—"An improvement in the construction and manufacture of wheels for locomotive engines, waggons, and other carriages to be used on railways."

"A cast-iron wheel is cast in the same manner as those in ordinary use in a cast-iron case, for the purpose of case-hardening the trod or tire of the wheel. The shape of the wheel is, however, different in the following particular:—In the trod or tire of the wheel a rebate of two inches wide is constructed to receive the crease; the rebate extends from the rim or outer edge of the tire towards the middle of the tire, and is one-eighth of an inch deeper towards the middle of the tire than it is on the edge or rim. The crease is made of rolled malleable iron, made to fit the rebate and to project sufficiently from the trod of the wheel to prevent the wheel from quitting the rails of the railway. The crease is then formed into a hoop, and when it is hot is fitted on to the cast-iron wheel on the side of the wheel where the rebate is formed. In cooling the crease contracts, and the rebate being deeper towards the middle of the tire the crease, by means of this bevil, grasps the wheel, is prevented from being forced off, and bends the wheel together. The crease of the wheel being subject to little wear and tear the wheel with a wrought-iron crease will last longer."

The patentee mentions various advantages as arising from these arrangements.

[Printed, 6d. Drawing.]

A.D. 1856, March 19,—N<sup>o</sup> 653.

LACY, AUGUSTUS DACRE.—"Improvements in certain apparatus for taking-up and delivering mail bags and other packages from a railway carriage or carriages whilst the train is in motion."

According to this invention there is fixed, in the first place, on a line of railway apparatus consisting of a bracket or support, extending from a post fixed into the ground, such bracket or support carrying a bar, which extends in a direction parallel with the line of rails. At the end of this bar is fixed a pair of springs, of such form as to be capable of receiving a ring connected to the bag or package which is to be delivered from the train, and gradually to offer resistance to its motion until it is passed into a retaining hook and there held, such retaining hook being connected with a spring, so as to lessen the concussion occasioned by the ring passing into the hook. That carriage of the train from which the bag or parcel is to be delivered is furnished with apparatus which consists of a support, mounted on a pivot fixed to the side of the carriage, and carrying a bar with springs, similar to those mentioned above, and also a retaining hook with a spring, the stationary apparatus on the line and that attached to the carriage possessing, in fact, the same means of delivering or taking up a bag or package as required. The spring connected with the retaining hook is in each case contained in a kind of box, this spring being termed the buffer spring, from its being used to lessen the concussion of the ring on entering the hook, and on the box is a kind of socket, which is capable of receiving a sort of neck attached to the bag or package, and holding the latter until it is removed therefrom. The apparatus is shown as being double, that is, so arranged that a passing carriage may remove a bag or parcel from one part of the stationary apparatus, depositing another bag or parcel upon the other part thereof.

[Printed, 10d. Drawing.]

A.D. 1856, March 22.—N<sup>o</sup> 671.

MURPHY, JAMES.—“Improvements in means or apparatus for “stopping or retarding vehicles used on rail or other roads, “which improvements are also applicable to the brake wheels in “connection with stationary engines.”

In this invention the tenders and carriages of a train are each provided with a pipe into which steam may be admitted from the boiler of the engine, these pipes being connected to each other by short arms and universal joints, which may be screwed and unscrewed at pleasure, in the manner of hose pipes. From the pipes of the tender and carriages communications are formed with cylinders provided with pistons, the rods of these pistons being con-



nected to apparatus for applying break blocks to the wheels of the train upon the admission of steam to the cylinders, which is effected by the engine driver or stoker opening a cock provided for the purpose. The arrangements of the cylinders and pistons, with the parts connected thereto, are various. The cylinder of the tender is inverted, a link at the end of the piston rod being jointed to one end of each of two diagonal rods, the other ends of these rods being jointed to break blocks, and the arrangement being such that on steam being admitted into the cylinder the piston is raised, drawing the diagonal rods into a position more nearly approaching a straight line, and forcing the break blocks against the wheels, the weight of the piston and rods causing them to descend and again liberate the blocks when the steam is discharged from the cylinder, for which due provision is made. Breaks may thus be applied to the wheels on one side of the tender only, or by the use of a cross bar connected to the piston rod, on both sides thereof. In the arrangement applied to the carriages the cylinder is placed in an oblique position, the piston being connected with a slotted rod, the slot of which receives the upper end of a lever mounted upon a cross shaft, diagonal rods proceeding from short arms on this shaft to break blocks, which, upon the admission of steam into the cylinder, are forced against the wheels, and removed therefrom when the steam is discharged from the cylinder by a spring which is coiled round the slotted rod.

In another arrangement, which is shown as being applied to a railway van or waggon, the cylinder is arranged horizontally, and has in it two pistons, the rods of which pass out of the opposite ends of the cylinder, and are connected directly to the break blocks, which are forced against the wheels by the steam, on being admitted into the cylinder, forcing the pistons away from each other, springs being provided for the purpose of releasing the breaks when the steam no longer acts upon the pistons.

These arrangements are minutely set forth, but the details thereof may be varied. A guard is placed below the framing of each vehicle, for the purpose of catching and supporting any of the pipes or other parts of the apparatus that may become loose, thus preventing accidents.

The invention may be applied to working the breaks of stationary engines, as well as those of railway trains.

A.D. 1856, March 24.—N° 699.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—(*Provisional protection only.*)—"An improved coupling for connecting "carriages, locomotives, and all vehicles used on railways."

The main object of this invention is so to connect the carriages of a railway train with each other, "and the front carriage with "the locomotive, that while all remain upon the line of rails" the connections will remain perfect, but will admit of disconnection or disruption in case of the engine or any of the carriages leaving such rails, so that the rest of the train will not be forced to leave the rails also; another object of the invention being to render the coupling "self-connecting when the carriages are run up to each "other on the line." One of the connecting links of the coupling "is made of wrought iron, in the same way as the ordinary "coupling link, and when about to be coupled the end thereof is "brought against curved or cam pieces of the corresponding part "of the coupling, and thereby lifts up the coupling pin and "allows the link to pass under it; the pin then falls into the "link, and the latter cannot be withdrawn until the pin is lifted "up again. The cam or curved pieces connected with the coupling pin are so arranged that when the link is any great distance "out of a straight line," as it would be if one of the carriages were to run off the line, "the link would come under the cam "pieces, and lift up them as well as the coupling pin, and the "link would then be free to be drawn away from the coupling, "and would therefore be easily detached in case of any "accident."

[Printed, 4d. No. Drawings.]

A.D. 1856, April 3.—N° 809.

KITSON, FREDERICK WILLIAM.—"Improvements in the "manufacture of railway wheels."

This invention relates, firstly, to railway wheels constructed on what is termed the "L spoke" plan, "in which one spoke and "one adjacent segment of the rim or felloe are formed of one bar "of iron bent into a shape somewhat similar to that of the letter "L, and the outer or rim end of one bar being then welded to "the angle or bend of the next bar," and this part of the invention consists in thickening the spoke bar, or forming a protuberance or protuberances upon it at the part which forms the bend

or angle, "for the purpose of supplying the diminution by bending and welding, and of enabling the junctions to be made strong and perfect," this object being further aided, if desirable, by thickening the ends of the bars which have to be welded to the angle, and these arrangements preventing that weakening of the wheel by the operations of bending and welding which takes place when the bars are of uniform section throughout. This part of the invention is also applicable to wheels in which two single spokes and the intermediate portion of the rim or felloe are formed out of one and the same bar, and combined with filling pieces, the latter, as well as the elbows of the bar, being thickened if desirable.

Secondly, the invention relates to wheels having cast-iron naves and wrought-iron spokes, and consists in forming projections, fins, indentations, or other irregularities on the spoke bars during the process of rolling the latter, by which means a holding for the cast metal is obtained "at less expense and better adapted to the purpose" than by the system of punching or jaggling the inner ends of the spoke bars by hand, as usually practised.

A third part of the invention relates to the formation of wrought iron naves for railway wheels. Instead of forming the spoke bars with greatly enlarged inner ends, which when welded together form a complete nave, the spoke ends are allowed to remain of nearly similar section to the rest of the bars, and the required circular mass being completed by inserting separate pieces of iron between them, "the spoke bars being so formed or shaped as to lock or hold these pieces securely in place during the process of welding," side plates or washers being added in the usual way, if desired.

[Printed, 10d. Drawing.]

A.D. 1856, April 7.—N° 847.

GRAVES, JOHN, and HENSON, WILLIAM FREDERICK.—  
(*Provisional protection only.*)—"Improvements in lubricating carriage and other axles."

This invention consists "in a novel construction of the journals of axles and of the grease boxes connected therewith, applicable for railway carriage axles, and other axles requiring continuous lubrication." The inventors "form on or affix to the journals of the axles one or more rings or annular ribs, which, dipping in the oil or grease in the bottom of the grease

" box will always raise a sufficient quantity while rotating to lubricate the journals, for while the lower part of the rings or ribs are receiving oil, the upper portion will be distributing it from each side on the journals."

The rings or ribs may either be solid or hollow, and may vary in depth and external form. In some cases they are grooved, leather or other suitable material being inserted into the grooves in order to increase the quantity of oil raised. Friction rollers may also be arranged in the bottom of the grease box, in order to afford a bearing to the rings or ribs on the journals.

[Printed, 4d. No Drawings.]

A.D. 1856, April 8.—N° 852. (\* \*)

CURTIS, WILLIAM JOSEPH.—"Improvements in lubricating the axles of locomotive engines, and of carriages on railways."

This invention has for its object the lubrication of locomotive carriages, by placing a disc or projection on each of the axles, the periphery of which rotates in a vessel beneath the axle, and by centrifugal action throws the lubricating fluid (soft soap and water) against a suitable surface, from which it passes to the surface of the axle.

When the axle is at rest the lubricating material sinks to the bottom of the box, but on the wheel turning round it is thrown by centrifugal action to the upper part of the casing, whence it falls into side channels, and thence into an upper receptacle, from which it descends through small central and lateral holes upon the part to be lubricated, the object being to cause the lubricating substance to descend upon the rising side of the axle, as well as upon the centre, and to descend in a stream, and not drop by drop, or by capillary action, as in some axle boxes.

The back of the box is sealed against dust by a circular brush, the hairs of which being very flexible are by centrifugal action thrown outward, and pressing slightly against the ring of the axle box effectually exclude dust.

[Printed, 6d. Drawing.]

A.D. 1856, April 9.—N° 856.

WHITGREAVE, JOSEPH ROBERT.—"Improvements in the arrangement and construction of locomotive engines."

This invention relates, in the first place, to a certain arrangement of the steam cylinders "in connection with two driving axles

"and two pairs of driving wheels." The cylinders are placed "midway between two pairs of driving wheels and axles, which "are so disposed as to bear nearly the whole weight of the "engine," a third or fourth pair of wheels being added as leading or trailing wheels, "to complete the complement of six "or eight wheels required for the safety of the engine." The cylinders are mounted in the usual manner, the piston rods, however, passing out at both ends thereof, the weight of the pistons and rods being supported by guides, and friction of the pistons upon the lower parts of the cylinders being thus prevented. The piston rods are furnished with connecting rods at each end, these connecting rods communicating with cranks on the leading and rear driving axles, the cranks being so arranged "that both "engines may not be at the same time on the dead point," the patentee stating that this arrangement obviates the tendency to oscillation which would otherwise exist, and at the same time gives the wheels increased hold or bite on the rails.

Another part of the invention relates to the method of connecting locomotive engines and tenders together, and consists in forming the end of the tender of convex figure, the corresponding end of the engine being concave to receive it, the two being connected by a draw bar attached to the engine, "and jointed at the "point or centre from which the curve of the junction is struck, "from which point to the rear draw hook the draw bar is "continued, and slides in suitable bearings. The tender is held "close up to the engine while running. The joint pin of the "draw bar may or may not be fixed to the tender," and thus "the engine and tender are made as one body, the one steadying "the other, and preventing any side motion, and giving a clear "floor and secure footing to the engine driver," permitting also the engine tender easily to pass round curves of small radius. An elliptical spring may or may not be placed between the points of fixture of the engine and tender, and instead of the end of the tender being convex, and that of the engine concave, the reverse may be the case.

[Printed, 1s. 4d. Drawings.]

A.D. 1856, April 9.—N° 858.

CHRIMES, RICHARD.—"Improvements in buffers and other "springs for railway and other carriages."

This invention relates mainly to the buffer springs of railway engines or carriages, and consists "in placing two or more helical springs of the same or different lengths in a suitable spring box, in which works the inner head of the buffer rod or ram, or the rod or ram which receives the shocks to be deadened. The springs are of a helical construction, and are arranged concentrically, one inside another, the inner springs being made of smaller diameter for that purpose. As the springs are contained in one common spring box, without any partitions to divide or separate them from each other, it is necessary, in order to prevent one spring from becoming entangled or foul of another, to make them of contrary twists, that is, right and left springs alternately. To obtain a gradually increasing resistance, and render the springs compensating, they may be made of various lengths, so that, as the pressure increases, more springs will be successively called into play, offering an increasing amount of resistance corresponding with the increased pressure."

The patentee mentions that the spring box, being without partitions, will be "reduced in weight," and rendered more economical in the manufacture than those usually employed; and that the invention is applicable not only to buffers, but also to bearing and draw springs for railway and other carriages.

[Printed, *ed.* Drawing.]

A.D. 1856, April 12.—No 877.

FLINT, WILLIAM BRAGG.—(*Provisional protection only.*)—

"Certain improvements in fasteners for shutters, windows, doors, and such like purposes, and which said fastening is also applicable to the coupling of railway carriages and trucks, and other useful purposes."

This invention consists, in the first place, "in so forming the shutter lift or rest for the bar in such a way that it is not possible for the bar to be pulled either up or down on the one shutter without affecting the whole, thus forming a complete prevention against the too frequent act of the burglar of freeing and dropping a shutter preparatory to his cutting the glass for entering the shop or robbing the window."

Secondly. In so forming the pin (that usually passes through the end of the shutter bar and sash frame, to be secured on the inside by a cotter) in such a way that it has only to be pushed



" in, when it will be held on the inside by a spring catch; this  
 " is effected by making the end of the bolt conical, and with a  
 " neck or shoulder, which when placed in its position, the  
 " conical end of the pin will press against the end of the spring  
 " catch, forcing it back, to be again thrown forward when the  
 " bolt is thoroughly in, by means of a suitable spring, when the  
 " bolt will be held by the catch pressing it at the neck or  
 " shoulder, thus obviating the too frequent careless act of not  
 " securing the shutter bar by the omission of the cotter." This  
 contrivance is mentioned as being susceptible of considerable  
 modification; "as, for instance, the bolt may be round, square,  
 " or of an oblong form in its transverse section, and may be  
 " double-bevelled at the end, thus allowing the catch or bearing  
 " to press on both sides of it; and in this form, or in the way  
 " before described, it may be beneficially used as a coupling for  
 " railway carriages and trucks, and other such like purposes."

[Printed, 4d. No Drawings.]

A.D. 1856, April 15.—N<sup>o</sup> 901.

DEMAIN, JOSEPH.—(*Provisional protection only.*)—"An im-  
 " provement in connecting railway carriages."

According to this invention the connecting or coupling of rail-  
 way carriages together "is effected by self-acting catches attached  
 " to each carriage, and working into each other, so that when a  
 " carriage is pushed against another, it will fasten itself, and it  
 " thereby renders it unnecessary to enter between the carriages  
 " when they are required to be fastened. The catch coupling  
 " consists of a rod, with a tapered catch at its end, and is fixed  
 " into the railway carriage where the ordinary couplings now in  
 " use are fixed," this catch being "made to meet a similarly  
 " tapered catch (attached in a similar manner) on the other  
 " carriage. When the catches meet the rods give way, so as to  
 " allow the catches to pass over each other until they reach the  
 " end of the taper. The rod of the coupling is then pressed back  
 " to its position by a spring acting upon it, so that the catch to  
 " each enters a socket at the back of the corresponding catch on  
 " the other rod."

The invention is stated to include a mode of releasing the  
 catches when requisite "by the action of levers operating against  
 " the face of the tapered catch."

[Printed, 4d. No Drawings.]

A.D. 1856, April 17.—N° 916.

**JOHNSON, JOHN HENRY.**—(*A communication from Jackson Brothers, Petit, Gaudet, and Company.*)—"Improvements in the " manufacture of tyres."

This invention relates to certain improved processes and machinery for manufacturing wheel tyres with or without welding, but without being subjected to much hammering.

The invention consists, in the first place, of a peculiar system or mode of rolling the iron, and of stamping it into suitably shaped matrices. Secondly, in a mode of forming tyres without any welding whatever from rough blanks, "which are rolled directly " without hammering of any kind." Thirdly, of an improved construction and arrangement of rolls, "worked either vertically " or horizontally, for rolling out the blanks into wheel tyres."

The rough blank for the tyre is formed out of a bar of a flat rectangular section, or with a shoulder on one edge to form the flange of the tyre. This bar is raised to a welding heat, and coiled flatwise in a volute form round the conical end of a roll, and then removed therefrom by removing an end disc, which serves as a guide during the coiling of the bar. Another ring is then formed out of a bar having a wedge-shaped section, the ends of this bar slightly overlapping, and being, if desired, bevilled off "to form an even junction." This ring is then placed in the central aperture of the blank, with its thickest side or end on the side of the blank from which the flange of the tyre is to be formed. The whole is now heated, and placed in a matrix, having the exact form which it is proposed to give to the intended blank, and is subjected to a stamping or hammering process, the face of the hammer having a conical projection thereon, which enters the central aperture of the blank, and expands it laterally on all sides until it fills the matrix. If desired, the hammer may be made of the form of the matrix, the latter having the conical projection.

These arrangements may be modified by a coiled blank, without an internal ring, being placed on the end of a roll, and rolled between the latter and a second roll which forms the flange, no hammering being required, although if preferred the blank may be placed in a matrix, and expanded by a hammer having a conical projection thereon, which enters at each stroke into a metal ring formed of segments, a flat surface or flange on the hammer

flattening the edge of the blank, the latter being afterwards finished by rolling in a machine in which one roller works in fixed bearings, while the bearings of the other are moveable, allowing it to rise and fall, a third roll pressing against the edge of the tyre as it is being rolled. In another arrangement the mechanism consists simply of two rolls, one turning vertically and forming the inner surface of the tyre, and the other turning horizontally, and having its horizontal surface shaped so as to form the outer or bearing surface and flange, whilst the two edges of the tyre are formed, the one by a prolongation of the axis of the horizontal roll, and the other by a ring or projecting collar or flange in the back of the vertical roll. The tyres may be steeled on their outer surfaces by forming the latter portion of the bar used in coiling the blank of steel. Tyres of cast steel may also be readily formed by rolling and treating them as above described.

[Printed, 8d. Drawing.]

A.D. 1856, April 21.—N° 947.

HEYNS, PATRICK.—(*Provisional protection only.*)—"Improvements in railway wheels."

The inventor first says:—"I prepare a cast or wrought iron circular ring, of proper diameter and thickness, for the rim or tyre of my wheel, having on it a suitable flange. I similarly prepare a cast or wrought iron nave, of the proper diameter and thickness, having a perforation in the centre for the axle. If either of these (the tyre or nave) be made of cast iron, it may have, if necessary, a wrought-iron rim fixed securely round its outer surface, and the flange of the tyre may have a shifting flange secured to its inner or outer surface or face. Having now placed the said tyre and nave in their proper relative positions, I fix on them and to them two wrought or cast-iron discs or plates, one on each side, firmly bolted, screwed, or riveted, circular, and of a diameter nearly equal to that of the tyre or rim." He then proceeds to state that these discs or plates may be either straight or curved, "preferably the latter, having their outer faces concave, with a suitable perforation in the centre for the axle to pass through," and that the wheel may also be made having only one plate, a tyre and nave being fixed either to one side or to both, and the flange being formed either "by the prolongation of the disc beyond the tyre, or on the tyre, or on both." He further states that when the tyre

and nave "are fixed on both sides of the plate or disc, the wheel " may be used with either face outwards," and that, " moreover, " the tyre and plate, or the plate and nave, may, if necessary, be " constructed of one piece."

[Printed, &c. No Drawings.]

A.D. 1856, April 24.—N° 988. (\* \*)

NEILSON, WALTER.—" Improvements in locomotive engines."

These improved locomotives, suited for working mineral lines of railway or goods traffic, have each a single cylinder placed horizontally and longitudinally beneath the fire-box end of the boiler. The engine is carried on from coupled wheels, and the cylinder end just clears the hindermost axle. The piston rod works out beneath the driver's foot plate; its projecting end carries a long crosshead, having its ends entered into parallel guide slots, and to each end is jointed the after end of a long outside connecting rod, which passes forward outside the framing to a crank pin in the after driven wheel. The wheels are coupled to act in concert, and also to produce a better action in passing the " dead centres," and by arranging the coupling pins on one side of the engine, a quarter of the circle round in advance of the same parts on the other side, the connecting rods can never act in opposite directions. The slide valve on the upper side of the cylinder is worked by a single excentric on the front axle, its rod being formed with two " gabs." The " brake action " is worked by a lever handle on the after end of an inclined shaft, the opposite end of which works a nut in the upper end of the brake lever, the rocking shaft of which carries a pair of levers actuating a pair of " brake blocks " behind the front wheels.

The fire-box is prolonged to a considerable distance into the cylindric barrel of the boiler, and has a brick bridge near the tube plate. A feed pump plunger is attached to the piston rod cross-head. The smoke box is cylindric, and the fire-box flattened on its upper side.

[Printed, &c. Drawing.]

A.D. 1856, April 25.—N° 993. (\* \*)

HARDACRE, JAMES.—" Improvements in the arrangement and " construction of carriages and carriage wheels."

Part of this invention relates to wheels for common road carriages, railway carriages, and artillery, and consists in making

them with spring spokes, which are curved to any desired form, and bolted or riveted to the rim and boss or nave. The spokes are made of tempered steel, and gradually taper in thickness or width from the boss to the rim. "The rim of the wheel may either be in one piece or composed of segments, and made of any width or shape to suit the various requirements. The rim may also be a compound of wood and metal," the metal part being made in the form of a circular trough, to receive segmental pieces of wood, which constitute the outer or running surface of the wheel.

[Printed, 1s. Drawings.]

A.D. 1856, May 3.—N° 1051.

WRIGHT, JOHN, and GORRERY, THOMAS.—(*Provisional protection only.*)—"Improvements in railway carriage and other springs."

This invention consists in "using cast or other kinds of steel, or other metal sheets or plates of a less thickness than No. 6 wire gauge, being placed together in the formation of springs instead of plates or bars of a greater thickness, as now used for long bearing, buffer, draw, and other springs, by which alteration of thickness of the steel or other metal, greater lightness, elasticity, and durability of the springs are secured," springs thus formed being applicable not only for railway purposes, but to carriages in general, as well as for other uses.

[Printed, 4d. No Drawing.]

A.D. 1856, May 7.—N° 1071.

CURTIS, WILLIAM JOSEPH.—"Improvements in carriages to run on rail or tramways and common roads."

The object of this invention is so to construct carriages that they may be capable of travelling upon either rail or tramways or common roads at pleasure. To this end a carriage "is made with suitable wheels to run on common roads, but it is preferred that they should be somewhat wider than usual. And in order to cause the carriage wheels when running on tram or rail ways to keep on the rails, there are additional smaller wheels applied to the carriage, suitable for running in or on the rails, and these additional wheels are capable, by levers and connecting rods or suitable apparatus, of being raised or lowered by the driver or

" other person; hence, when it is desired that the carriage shall  
" be retained on the rails, the additional wheels are lowered and  
" become guide wheels for the carriage; but when the carriage is  
" to run off the rails into a common road the additional wheels  
" are kept out of the way, and such is the case so long as the  
" carriage is to run on a common road."

Different modes of carrying out the invention are described. In one case each axle of the carriage has loose upon it two plain wheels, these being for use on common roads, while inside each of these is a flanged wheel, also mounted loosely upon the axle and on a part thereof which is slightly eccentric with the rest, the result being that on turning the axle into one position the flanged wheels are lowered into a position for operating upon a rail or tram, while on turning the axle into another position, they are raised out of action, this moving of the axle being effected by means of certain clutches, levers, and other apparatus, so arranged in connection with the plain wheels of the carriage that an attendant by moving a lever can cause those wheels to change the position of the axle at pleasure. Other modes of raising and depressing the flanged wheels are described, and in some cases two small flanged wheels are so mounted inside each of the plain wheels that one or other of them can be brought into action as may seem desirable, while in another arrangement one small flanged wheel is brought into action in front of and another behind each of the plain wheels.

[Printed, 10d. Drawing.]

A.D. 1856, May 9.—N<sup>o</sup> 1103.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from A. Duboy.*)—"Improvements in machinery for the manufacture  
" or finishing of tyres, hoops, and rings."

In this invention two grooved rolls or cylinders are employed, one placed above the other, and so arranged that when the rolls are in working position, the projections of one roll may come opposite the grooves in the other, and vice versâ. The rolls are supported, and revolve in bearings formed in pedestals fixed to a suitable platform or base plate. The distance of the rolls asunder is regulated by screws, which may be actuated by pinions and winches, or other suitable mechanism, and they may be caused to revolve in the usual manner. The upper roll is coupled to its driving shaft by a long coupling, supported on an upright, and



so constructed as to allow the roll shaft to move backward and forward on it, and this roll is, moreover, raised and lowered in its bearings by means of weighted levers or hooked rods, and is drawn back and brought forward by means of a rack attached to a lug on a collar which embraces a groove in the roll; the roll, however, being free to revolve within the collar. The rack is actuated by a pinion on a shaft and winches. The action of the machinery is as follows:—The upper roll is first raised by the weighted levers, and drawn back by the rack, the tyre or hoop to be operated upon is placed in a groove in the lower roll, shaped to correspond with the external contour which it is desired to give to the hoop or tyre; the upper roll is then brought forward, placed through the hoop or tyre, lowered into its place by the lever, and screwed down to bear against the inner surface of the tyre, rotary motion being then given to the rolls in the usual or any suitable manner.

The details of the invention are minutely set forth, by the aid of several drawings annexed to the specification.

[Printed, 2s. 6d. Drawings.]

A.D. 1856, May 13.—N° 1129.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Improved machinery for removing snow from railroad tracks."

This invention relates to the "snow plough." Before describing the invention the patentee mentions that the snow plough ordinarily used is provided with two vertical curved shares or surfaces, which act so as to press the snow directly from the tracks in a lateral direction, and that the result of this is that the snow becomes wedged or packed together at the sides of such tracks, rendering it difficult for the plough to pass onwards, much of the snow, moreover, falling back upon the tracks when the plough has left it. He then states that according to the present invention the plough is so constructed that "a simple inclined plane or wedge will act in the first instance to raise up the snow entirely, and then two vertical surfaces curving laterally will press off the snow so elevated on to the top of the surrounding snow," by which means the lateral packing and jamming of the snow, and the return of snow to the tracks, which are the results of the use of the ordinary plough, are avoided.

The invention is very clearly set forth by the aid of a drawing annexed to the Specification, the plough being mounted upon

two trucks, having four wheels each, and occupying a position in front of the engine of the train. Below a portion of the inclined plane is a hollow space, in which hot water pipes or other means of warming the incline may be arranged, this diminishing the adhesion of the snow to the surface of such incline. When there is a crust of ice upon the snow, two sharp vertical plates may be attached to the sides of the plough for the purpose of cutting such ice.

[Printed, 6d. Drawing.]

A.D. 1856, May 14.—N° 1138.

SCOTT, URIAH. — “Improvements in public carriages and various parts of the same, which parts may be used separately and applied to vehicles of any description.”

This invention relates, in the first place, to omnibuses, and consists in placing one seat behind another, so that each passenger shall have a separate seat, with a projection in front of the vehicle, and “a displacement at the side for high wheels.” The floor of the omnibus slopes backwards, rendering the second seat somewhat lower than the first, and so on in succession.

Secondly, the invention relates to combining felt or india-rubber with metal or earthenware in making bearings and axles, “so as to isolate them and prevent vibration.” Several modifications of this part of the invention are described, in two of which the elastic matter is placed so as to surround the journal of the axle, while in a third case the bearing of the axle is formed in two parts, with elastic matter between them. This part of the invention is set forth both as being applied to railway carriages and to vehicles for common roads.

Thirdly, the invention consists in “making the fore part of a carriage with a large wheel or turnplate and semicircular springs,” so that the wheel can “work up the centre,” one wheel only being used in front of the carriage.

Fourthly, in making wheels and the parts in combination therewith in such manner as to give elasticity thereto by the introduction between certain of the parts of felt, india-rubber, or similar material, various modes of accomplishing this part of the invention being set forth.

Fifthly, in forming springs of metal combined in certain parts with felt and leather, “so as to prevent noise or rattling in them,” this part of the invention being also applicable to scroll irons and

" make up the ring or fellow of the wheel be held securely in  
 " the dovetail groove produced on the inside of the tyre."

[Printed, 4d. No Drawings.]

A.D. 1856, June 9.—N° 1362.

HOWELL, JOSEPH BENNETT.—(*Provisional protection only.*)—

" Improvements in the manufacture of cast steel tyres for railway  
 " locomotive engine and carriage wheels."

This invention consists in forming tyres for engine and carriage wheels of cast steel, by running such cast steel into a mould formed on or attached to the outer rim or periphery of a disc which is caused to rotate on its axis at a considerable velocity, either vertically or horizontally, the centrifugal action thus obtained causing the fluid metal to condense and fill the mould much more perfectly than would be the case if the operation were performed with the mould in a state of rest. Rotation is continued until the metal has set, when the casting is removed from the mould.

[Printed, 4d. No Drawings.]

A.D. 1856, June 16.—N° 1418.

GUÉRIN, EDOUARD.—" A self-acting apparatus for working  
 " railway brakes."

The patentee mentions in the first place that in the brakes generally used on railways " the pressure of the wooden blocks  
 " against the wheels is operated by means of a crank worked by  
 " an attendant," whereas the present invention consists " in  
 " making use of the pressure exercised on the buffer springs of  
 " the waggons of a train when the engine-driver shuts up the  
 " throttle valve and causes the brakes of the tender to be  
 " tightened," a resistance being thus produced " ahead of the  
 " train " which is " rendered available to lock up all the waggons  
 " provided with self-acting brakes."

An arrangement is described in which brake blocks are mounted in the ordinary manner between the wheels of a railway waggon and pressed against the wheels when requisite by means of links and levers worked from a cross shaft, there being upon this shaft two levers projecting upwards behind the buffer springs, which in this case are placed across the waggon, the result being that on the buffer rods being forced inwards these springs so act upon the

levers on the cross shaft that the breaks are brought into operation. In order, however, to provide for the backing of a train of waggons having breaks thus arranged without such breaks coming into action a certain "forked piece" is hinged to the frame of the waggon in such a position that it may either be brought down with its ends behind a shoulder on the draw rod or be raised therefrom. When so brought down it prevents any inward motion of that rod, and the latter is so contrived as then to prevent any inward movement of the buffer spring and consequently any action of the brakes. The position of this forked piece is regulated by means of a grooved block mounted on one of the axles of the waggon, and so contrived in relation to a certain lever and other mechanism that while the train is in motion the centrifugal force of the block causes it to assume such a position with respect to the lever as to keep the forked piece raised, while on the train being brought to a stand such forked piece is allowed to descend behind the shoulder of the draw rod, as mentioned above. A "repelling spring" is used to bring the buffer spring back to its place after the brakes have been in action, and arrangements are made by which the brakes may, when necessary, be brought into action by hand. The patentee mentions also that the brakes may be made self-acting "by the backwards motion of the train," the brakes in this case being "actuated by means of the propelling rod" instead of by "the buffers," and it being "sufficient to lock up the last waggon to cause all the other brakes of the train to press against the wheels."

The details of the invention may be varied, the patentee stating that his invention consists "in the application of the principle of self-action applied to the brakes of waggons whatever may be the system of the brakes employed."

[Printed, 1s. Drawings.]

A.D. 1856, June 17.—N° 1432.

DEPAI, ALEXANDRE. — (*Provisional protection only.*) — "Improvements in brakes for railways."

This invention consists in so arranging the brakes of a railway train that at the will of the guard skids or shoes may be brought under the wheels of each of the carriages composing the train. "For this purpose a horizontal shaft is employed which passes the whole length of the train, and it is suitably coupled between the carriages. On this shaft within the frame of each carriage

" are fixed drums from which chains pass to levers, which at their  
 " lower ends carry skids or shoes. When the shaft is allowed to  
 " turn so as to unwind the chains from the drums the skids or  
 " shoes drop under the wheels, and when the shaft is turned so  
 " as to wind up the chains the skids or shoes are raised, and when  
 " up they are prevented from again descending by a lever or  
 " instrument which locks the handle, by which motion is given to  
 " the shaft." The unlocking of the handle may be performed  
 not only by the guard of the train, but by apparatus placed by  
 the side of the railway "at a short distance from each station,  
 " which displaces this locking lever and sets the shafts free, or as  
 " to bring the skids under the wheels."

[Printed, 4d. No Drawings.]

A.D. 1856, June 21.—N° 1459.

HOWELL, JOSEPH BENNETT.—(*Provisional protection only.*)—  
 " Improvements in the manufacture of cast steel tyres."

This invention consists "in submitting rings of cast steel or  
 " ring ingots, cast by centrifugal force, or by any other suitable  
 " method, to rolling and annealing processes for the production  
 " of tyres, so as to free them from brittleness and give greater  
 " strength to the metal."

[Printed, 4d. No Drawings.]

A.D. 1856, June 24.—N° 1480. (\* \*)

DAVIES, DAVID.—(*Provisional protection only.*)—"Improvements in wheel tyres," which the inventor thus describes, "I take  
 " an iron tyre, having flanges or projections at the sides, which I  
 " shrink on the fellys of the wheels in the usual manner. I then  
 " take a strip or band of leather of sufficient thickness to fill up  
 " the space between the flanges of the tyre, and fasten it therein  
 " in any suitable manner. I then take a second wider strip of  
 " leather, which I fasten round the former, securing them to each  
 " other and to the wheel by nails or other fastenings passing  
 " through to the fellys of the wheel; by which means I form a  
 " durable and noiseless tyre."

[Printed, 4d. No Drawings.]

A.D. 1856, June 24.—N° 1483.

JOHNSON, JOHN HENRY.—(*A communication from Jean Baptiste Marie Albert Coochot.*)—"Improvements in railway breaks."

This invention relates to the employment of shoes or skids, which are made so to operate when desired as to lift the carriages or waggons of a train entirely off the rails.

According to one modification of the invention a certain number or the whole of the carriages in a train are each "fitted with four shoes or skids, placed each in front of the wheels of the carriage." These shoes are connected to lever arms, which have a slight vertical play at their upper ends in suitable sockets, formed on two shafts working in bearings below the framing of the carriage, one shaft being at or near the front, and the other at or near the back of the carriage, the object of the vertical play being to compensate for the varying height of the body of the carriage caused by variations in the number of passengers therein. Each pair of skids or shoes are connected by a transverse bar, and the back and front pairs are connected by a longitudinal rod and one or two links of a chain, "so that their coupling may be adjusted as required. The front pair of shoes or skids are connected by means of a lever and vertical rod to a hook, fast on a horizontal, longitudinal, actuating shaft, working on bearings on the roof of the carriage."

The longitudinal shafts of the various carriages of the train are made to act simultaneously by their being a sort of winch formed on the end of one which bears against an arm on the end of the next, the result of the whole arrangement being that on turning one of the shafts partially round, the other is turned also, the hooks are disengaged from the suspension rods, and the shoes or skids (which are flanged and formed to receive the wheels) instantly descend upon the rails, the wheels of the carriages being then raised from the rails and running upon the skids.

In another modification of the invention only one lever arm is used for connecting each pair of skids to the short transverse shaft underneath the carriage framing, such arm being forked at its lower end, and bolted to the transverse bar which connects the skids of each pair. "In this case in place of the arm having a vertical play through a socket in the shaft, the shaft itself is made to work at its bearings in vertical guide slots."

Different arrangements of the details of the invention are described, in some cases the axle boxes being made the supporting media of the skids, and the details being varied according to circumstances.

[Printed, 10d. Drawing.]



A.D. 1856, June 24.—N° 1485.

ROBSON, SAMUEL SINCLAIR.—(*Provisional protection only.*)—  
“Improvements in railway and other carriage breaks.”

This invention “consists in the use of conical friction surfaces in combination with suitable mechanism for actuating them. One of the cones is attached to the wheel of the carriage. The other cone is hollow, and is upon the axle of the carriage, having a spring or other mechanism to press it upon the first mentioned cone. When the break is out of gear, or not in contact, the hollow cone is kept back by a catch, which catch may be released by the guard or engine driver turning a longitudinal bar or other arrangement of mechanism the entire length of the train. If a screw or lever is used the cone will only need to be drawn back half an inch or so; if a spring is applied it may require more, say, three or four inches, to help the spring with the impetus. The cones coming together, the friction stops the wheels.”

The inventor states that the cones may be of any suitable substance, and that it is intended to have “a break on both ends of the axle,” actuated by “the same movement of the screws.”

[Printed 4d. No Drawings.]

A.D. 1856, July 1.—N° 1543.

HARVEY, GEORGE, and HARVEY, ALEXANDER, junior.—  
“Improvements in machinery or apparatus for boring and drilling.”

This invention relates more particularly to drilling or boring the bolt holes in the circumferential portions of railway wheels for fixing the tyres, but the machinery employed may also be used for other purposes.

“According to a convenient modification of such machinery a horizontally acting drilling spindle is fitted up with suitable driving pulleys and gearing upon a slide which is made adjustable as to height upon a vertical cast-iron pillar or pedestal. The wheel to be drilled is set during the operation upon a number of antifriction rollers arranged at the base in front of the drilling spindle. The wheel is simply run in on rails to these antifriction wheels, which can be adjusted to suit wheels of various diameters, and which allow the wheel to be turned

“ round to bring the different points of the tyre opposite to the drill. The drill is adjusted as to height, so as to be pointed directly to the centre of the wheel, and when the wheel is brought up to the drill a clamping arm, connected to the pillar, is made to enter inside the rim of the wheel, so as to hold it firmly up to the drill. With this apparatus wheels can be drilled with great rapidity and accuracy.”

The details of these arrangements may be varied.

[Printed, 8d. Drawings.]

A.D. 1856, July 7.—N° 1589.

CHENOT, ALFRED LOUIS STANISLAS, and CHENOT, EUGÈNE CHARLES ADRIEN.—“Improvements in machinery for compressing metallic sponges and other substances.”

This invention is set forth at considerable length, and illustrated by drawings containing a large number of figures. The main feature of the invention consists in the employment of stampers or puncheons, which are made to operate upon the material under treatment while the latter is contained in a block or mould, composed of a tube, which may be either of some length and be contracted in diameter towards the end opposite to that at which the puncheon enters, so as to cause condensation of the material as it is driven through the tube, or such tube may be of cylindrical or other form, and the material be compressed between a puncheon entering one end of the tube and a second puncheon or instrument entering the other end, the compressed material being in this case forced out of the upper part of the tube by the rising of the second puncheon after the compression. The puncheons may be either solid or hollow, and one may fit into the other if desired. And in cases in which it is desired to operate on nuts or female screws or other articles in which it is necessary to preserve a central opening, this is effected by the use of one solid puncheon which compresses the nut or other article around a central spindle or dowel, which, again, may sink down into a second hollow puncheon, both the latter and dowel rising after the operation; or the compressing puncheon may be hollow and work over the dowel, the latter in this case being fixed in the lower puncheon. These arrangements may be applied, among other purposes, to the compression of “railway carriage wheels, tyres, rings, &c.” there being in the case of wheels with arms as many dowels as there are

arms in the wheels, in addition to that which fills the central hole. In some cases the dowel or dowels may be caused to rotate.

The invention is described under a great variety of modifications, one of which is set forth in particular as applicable to the stamping of an iron band for the purpose of converting it into a railway carriage wheel tyre. The band is first bent into a circular form and has its ends welded together, being then placed in a heated state in a kind of mould which is supported by a hollow anvil, and then struck repeatedly by a large flanged puncheon, which is actuated by steam through the medium of a suitable piston and cylinder mounted above the anvil, racks connected to the piston rod giving rotary motion through the medium of toothed pinions to certain fly wheels.

The puncheons employed for the purposes of the invention may, however, be actuated by various means, including hydraulic and pneumatic pressure, the action of hammers, screws, racks, and other mechanism. And the patentees appear to consider that "a slow strong compression" may be advantageously substituted in many cases for violent blows caused by concussion, the latter system being more likely to injure the article under operation.

The invention may be used in the reduction of ores, the moulding of clays, and for many other purposes.

[Printed, 2s. 6d. Drawings.]

A.D. 1856, July 7.—N<sup>o</sup> 1599.

NOONE, JOHN HENRY.—(*Provisional protection only.*)—"Improvements in apparatus for retarding and stopping carriages on railways."

"On either side of a carriage there is applied a skid or sliding friction apparatus, parallel with the rails on which the carriage is running. Such skids or sliding friction surfaces, when out of use, are at a distance above the rails, but when it is desired to retard or stop a carriage, or train of carriages, these skids or sliding friction surfaces are lowered down on to the surfaces of the rails, and the apparatus is so arranged that when these friction surfaces are pressed closely to the rails the wheels of the carriage are lifted off the rails," and it is the "combination of apparatus used for lowering and raising these skids or friction surfaces on to the rails which constitutes the peculiarity of the invention." A frame is fixed between the axle boxes, to which the skids are connected by links so contrived that the skids

may be "moved up and down parallel to the rails," and on the upper surface of each skid are uprights which act as guide bars; and are moreover provided with inclines, between which bars carrying other slotted inclines are moved by means of arms on an axis connected to the bars by links. This axis receives motion from a screw axis which may be turned by hand, and there are projections or flanches on the skids "which retain them on the rails when they are sliding thereon."

Instead of the skids being arranged as above, they may be fixed to the side rails of a frame suspended from the axle boxes, such frame being raised and lowered by means of inclines on two sliding bars, the latter being furnished with racks which are in gear with pinions fixed on an axis, to which motion may be given by the guard or some other person, "by a screw acting in a nut carried by an arm on the axis, or by other mechanism." Instead of racks and pinions for moving the bars, other means may be used.

[Printed, 4d. No Drawings.]

A.D. 1856, July 9.—N° 1616.

ADAMS, WILLIAM BRIDGES.—"Improvements in railway wheels, axles, and axle boxes."

This invention consists, firstly, "in accurately boring the tyres and turning the wheels to guages," so that they "may be forced on by pressure, or shrunk on with a low heat, to avoid straining the iron."

Secondly, in securing the wheels to the tyres "by means of expanding hoops of a conoidal or conical form," different modes of applying these hoops being set forth.

Thirdly, in employing, instead of the coned hoops mentioned above, clips, the ends of which are driven into "coned grooves" in the tyre, various modifications of this part also of the invention being described.

Fourthly, in placing a layer of india-rubber, cork, or other elastic or compressible material between the tyre and the wheel, different modes of applying this part of the invention being described, and the compressible or elastic material being in some cases combined with thin hoops of metal. In some cases elastic metal hoops or segments are applied between the wheel and the tyre, with "provision for slight elastic action."

The details of the invention are set forth at great length, and embrace a multitude of particulars which can only be understood with the aid of the drawing annexed to the Specification. These include "circular gib and cotter ring fastenings" for carrying out the second part of the invention; expanding ribs or hoops, washer rings, and "hook head bolts," clip gib hoops, and other mechanism for use in the fourth part of the invention; provision for "power of lubricating to permit the tyre to slip round on the wheel to avoid friction between the tyre and rail" and also torsion of the axles; various arrangements of collars, wearing pieces, moveable bearings, and other mechanism connected with axles and axle boxes, for the purpose of securing the regular and complete lubrication of the axles, and providing for the ventilation and cleansing of the boxes; an "elastic spring or cushion" at the axle end in front of the box, to sustain the axle end and "save the front of the box from blows;" the application of moveable bearings to hollow axles, "to prevent the need of their being swayed down;" the combination of an open top front to an axle box with a "tight bottom of metal packed at the joint to retain oil, grease, or water in contact with the lower side of the axle;" a cast wheel of "sheeve form" on the edge, meant to run loose upon its axle and provided with a "large hollow" in its central part for the reception of oil, such wheel being furnished with a tyre of any desired form, and when two such wheels are placed upon an axle having outside bearings, only a hollow cylinder of hard wood being placed between them, "to gauge the distance," and the application to such wheels of tyres "with a single metal flange, or two edge flanges," or of "plain tyres without flanges to run in channel rails." Some of these particulars are set forth as constituting improvements upon the inventions for which patents were granted to the present patentee in the years 1846 and 1847, but the distinctions between those and the present invention are by no means clearly defined, the whole Specification indeed being of somewhat confused and unsatisfactory character.

[Printed, 1s. Drawing.]

A.D. 1856, July 10.—N<sup>o</sup> 1630.

RUSSELL, FREDERIC WILLIAM.—(*Provisional protection only.*)  
—"Improvements in the mode of coupling railway carriages."

The object of this invention is to enable railway carriages to be coupled together without a person passing between them. For this purpose the inventor in some cases employs "links similar to the ordinary screw links," there being in the centre of the right and left hand screw thereof a worm wheel, which is actuated when requisite by a worm mounted in bearings, carried by the screw, and having through it a square hole, through which a bar or shaft of sufficient length to reach from side to side of the carriages may be passed. "Two attendants, standing one at each side of the carriages, are thereby enabled to place the links in position on the hooks of the draw bars, and, by turning the bar or shaft, to tighten up as required." Instead of the worm and worm wheel, bevil wheels may be used; or instead of this arrangement, a bolt may be used for coupling the carriages, which bolt slides in a bearing or bearings carried by a lever or levers attached to the end of each carriage, such lever or levers resting, when the bolt is out of use, vertically against the end of the carriage, and being turned down into a horizontal position when it is desired to couple one carriage to another, the bolt being then "shot through eyes fixed to the end of the carriage to which it is attached, and through corresponding eyes attached to the carriage with which it has to be coupled."

[Printed, 4*l*. No Drawings.]

A.D. 1856, July 18.—N<sup>o</sup> 1692.

HIPKINS, GEORGE FREDERICK, and BRITTEN, JOHN.—  
"Improvements in applying springs or weights for the purpose of closing doors or resisting shocks, strains, or pressure."

This invention is set forth at very great length, and forms the subject of a large number of claims. According to one part of the invention "piston," "paragon," and "telescope" door springs are made so as to act as "arm springs," or in any modified form in which the door abutments of such springs are tied or connected with the door post abutments and loosely connected with the door.

Another part of the invention includes an arrangement in which a helical spring is made to operate directly on an arm in such a manner that the bearings of the spring may arrive at or near a dead or inoperative centre when the door is fully open, and this whether the arm be an appendage or part of the door spring, or whether the parts of the door spring collectively form the arm.



In another arrangement a roller, guided by one or more other rollers or radius rods, is made to work against an irregular incline for the purpose of operating against an arm for pressing against the back of a door or any equivalent for such arm, certain springs being used in this arrangement which are mentioned as forming parts of the invention claimed. In other arrangements a case containing a helical or other spring is made to act as one member of a double knuckle; in other cases a spring combined with a knuckle being made to act in conjunction with a cord or chain and a pulley. In other cases a knuckle on one side of a door is actuated by a spring or weight situated wholly or partially on the other or opposite side of the door; different forms of springs being set forth, as also a mode of making "Stanhope springs" serve as door porters, and an arrangement in which springs or equivalent apparatus are combined with knuckles actuated by cords and weights. A spring described as the bowstring spring is also set forth, which may be made to act either as an arm spring or otherwise; an open knuckle being in some cases substituted for the bowstring spring. Other parts of the invention relate to a spring which is described as an improvement of the spring known as Gerishe's door spring; to various modes of fixing arm springs and adjusting their pitch, and of adjusting the tension of the tensive members of "Stanhope's knuckles."

Also, the invention includes the application of knuckles and curved or corrugated straps of elastic metal arranged so as to act as stretched knuckles, to the construction of marine or ships' buffers, and railway carriage buffer and draw springs, such knuckles and straps being also applicable in the construction of the bearing springs of carriages, whether combined with links or legs or otherwise.

The invention further includes means of constructing and casing compound corrugated straps of steel or other elastic metal; also an "elastic chain" which may be used as a substitute for a single curved or corrugated strap.

Buffers are also described as being furnished with springs composed of thin corrugated plates, which are arranged in sets, with the corrugations of those of each set fitting each other, but the several sets being so placed that the outer curves of one set meet the outer curves of the next. The outer plates of the several sets are connected by hinges, and work upon bearings of well oiled wood or metal. The corrugations of these plates run "crossways,

" or lengthways, or diagonally," and the plates are surrounded by some flexible material, or the boxes in which they work are provided with stuffing boxes in order to protect them from the injurious effects of wet weather.

Buffer and bearing springs are also set forth as consisting of the combination of a curved spring with a flat surface, against which it is pressed when acted upon, different arrangements of this part of the invention being described, in some cases curved springs being combined with flat surfaces, and in other cases with inclined surfaces, while in one arrangement four curved springs are combined together without either a plane or an inclined surface. Straight springs may in like manner be bent over curved or irregular surfaces.

Bed and other springs are set forth as being composed of " taper plates, wound into a conico-convolute form or shape," and also of curved springs combined with flat and other surfaces.

[Printed, 1s. Drawing.]

A.D. 1856, July 23.—N° 1752.

PRÉVÔT, PIERRE CHARLES.—(*Provisional protection only.*)—  
" An improved railway break."

The inventor forms on the wheels of railway carriages " notched " or toothed flanges," and furnishes each wheel with a double pall or stop, which enters the teeth or notches of the flange when " actuated so to do." These double palls are supported on suitable axes, and mounted near to them are moveable longitudinal rods furnished with inclined planes, the arrangement being such that on the rods being moved in one direction, the inclined planes lift the palls from the wheels, while on being moved in the other direction they allow them to fall into contact therewith. The rods are provided with springs, which tend to move them in the proper direction for applying the palls, but they are drawn backwards and held by a detent or other suitable means until it is desired that the palls shall act, when they are released, and the palls then allowed to fall into the teeth or notches of the wheels, the rotation of which is thereby stopped. The rods of one carriage may be connected with those of another, and the wheels of all the carriages of a train be thus acted upon simultaneously.

[Printed, 4d. No Drawings.]

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[Printed, *1s.* Drawing.]

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[Printed, *4d.* No Drawings.]

A.D. 1856, August 1.—N<sup>o</sup> 1817.

PATON, WILLIAM.—(*Provisional protection only*).—"Improvements in railway wheels."

This invention relates "to the arrangement and construction of railway wheels composed of metal and wood combined, so as to be both durable and pleasant in working."

According to one modification of the invention, the nave and arms, or spokes of the wheel, are of wrought iron, forged in one piece. The arms are flat, and the portions of rim which they carry for receiving the tyre are formed with deep external flanges on one side, these flanges being on the side on which the tyre flange is ultimately to be placed, and forming, with the rim portions, a recess for the reception of a wooden felloe. This felloe is retained in position by transverse bolts, passed through the wood and through the edge flange of the rim, the wood being put on in pieces, and then clamped and wound up by an iron hoop, which is shrunk on outside such wood. The actual running tyre, which is formed with a short edge flange on its inner plain edge, is then put on over the binding hoop, and this completes the wheel. "The inside edge flange on the tyre protects the tyre from the lateral blows arising during running, and the whole forms a substantial and useful wheel."

According to another modification, "the nave and arms are of cast iron, but the wood is interposed at the felloe portion, in the general manner, herein-before described."

[Printed, &c. No Drawings.]

A.D. 1856, August 5.—N<sup>o</sup> 1844.

SISCO, ANTOINE DOMINIQUE. — "Improvements in railway brakes."

This invention "consists principally in the use of excentrics attached to the framing of the carriage, the object being to obtain a more rapid and efficient mode of stopping railway trains than is at present in use."

The invention is described under a great variety of modifications. In one case the excentrics are mounted upon the axle boxes, and are actuated by means of horizontal rods to which they are united by connecting rods, the horizontal rods being connected by cross pieces, and the whole forming a horizontal frame

which may be moved to and fro by a hand lever. On the latter being moved in one direction the excentric brakes are brought into a raised position, and out of action, and they are maintained in this position by a bolt which falls into a recess in one of the cross pieces, this bolt being attached to a short lever by which it may be raised when it is desired to apply the brakes, the weight of the latter then causing them to fall upon the rails, lifting the carriage therefrom, and by their friction on the rails bringing the train to a stand. In order to liberate the brakes the train must be backed, and then by the use of the lever first mentioned, the whole apparatus is brought back into its first position. The excentric brakes are flanged on one side to keep them in position on the rails.

In another arrangement the excentric brakes are keyed upon axles similar to those of the carriage wheels, and connected by transverse and longitudinal rods, a hand lever being connected to one of the brakes by which the whole may be raised out of action, being so maintained by a pin passing through the lever, on the removal of which the excentrics fall upon the rails, as in the first arrangement. They are here, however, prevented from falling with a sudden blow upon the rails by the employment of certain rods, links, and springs.

In another case the excentrics are actuated through the medium of a sliding rod, a rack, pinion, vertical shaft, and fly wheel, a lever, catch, and other mechanism being used in retaining the brakes in position when not required to act. The latter are in this case provided not only with flanges, but also with "jaw pieces" to grip the rails;" springs may also be employed to press against the latter.

Other modifications of the invention are described, in some cases the excentrics being made to press against the upper parts of the wheels, the arrangement being such that the weight of the carriage then assists in preventing the rotation of such wheels. In other cases the excentrics are caused to bear both against the wheels and against each other. In other cases, again, the brake is in the form of a wedge, with a curvilinear piece attached thereto; an excentric brake having its lower portion serrated being also set forth; cranks, screws, segmental racks, endless chains, and other mechanism being used in various forms in carrying out these modifications of the invention.

[Printed, 1s. 6d. Drawings.]



A.D. 1856, August 12.—N° 1893. (\* \*)

**HARDAKER, JOHN.**—(*Provisional protection only.*)—"Improvements in machinery or apparatus for stopping railway trains, which are also applicable for alarm signals generally."

The inventor proposes to fix at certain places on a railway an apparatus which will be acted upon by a passing train, which train will leave the apparatus in a position to act upon the next train (if such next train should approach to within a certain distance of the first train), so as to turn off the steam, turn on the whistle, put on the breaks, and so stop the train.

[Printed, 4d. No Drawings.]

A.D. 1856, August 18.—N° 1929.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication.*)—"Improvements in stopping or retarding railway carriages and trains, and in preventing carriages running off the rails."

This invention has for its objects:—First, "effecting the stopping or checking the speed of a railway train, by the application of friction to or on the rail by the hand wheel, winches, or cranks, upon each carriage, separately applied, as in the ordinary manner. Secondly, the application of the brakes in such manner that the whole force of the momentum of the carriage may also act as a force to check the speed. Thirdly, their application as a combined support and brake, in case of fracture or failure of an axle, disengagement of any of the wheels or other part, which would allow the truck, &c., to drop. And, fourthly, in a method of obtaining a firmer hold upon the rail."

At each corner of the frame of a carriage or truck is a strong bracket or frame, which is meant to sustain a brake. The latter is shaped like a rocker, and is so jointed to the bracket as to be able to vibrate, one portion, however, of its lower surface being straight, and its upper portion forming a vertical arm, the straight portion of the brake, when such brake is not in action, lying "parallel with the rail, and with a slight space between." All the brakes or rockers forming the set for any one carriage are connected to a rod passing along the bottom from end to end of such carriage, their connection with this rod being formed by means of cross levers, one end of each of which is connected to a brake block, and the other to the rod. "Thus the movement

" of the rod effects the movement of all the rockers connected with it, and to it, therefore, the power is applied when the brakes are to be set in action," and the effect varies according to the direction in which the rockers are moved, their motion in one direction having the effect of raising the wheels of the carriage or truck off the rails, and throwing the whole weight of such carriage or truck upon the rockers, which now act as " skids."

The operation of this brake " as a safety apparatus in case of accident, is as follows :—On the breaking of an axle or wheel, or by any means whereby a wheel or wheels should be carried away, the carriage would at once drop upon one or more of the rockers, as the case may be." If one end or corner only fell, the connection of the entire set is such that the whole would be put at the same time in operation, thus distributing the friction equally at the four corners of the carriage." The brakes also act as safety guides, " having flanges on their sides, which extend below the surface of the rails," and the brakes on the whole train " may be so connected as to be worked from the locomotive, especially for putting them down in the position required for arresting the momentum in case of danger."

These improvements " may also be employed as a safety apparatus, leaving the old brakes for ordinary use," and the invention includes the application of guard and guide wheels to the carriages, such guide and guard wheels being placed in an inclined position inside the rails, and being so combined with the brake apparatus that when the latter is brought into action, so as to lift the carriage or truck slightly from the rails, the lower flanges of the guide wheels come into contact with the lower sides of the heads of the rails. " The joint action of the brake and of this wheel, therefore, embracing the rail between them effects a very powerful holding upon it, whereby the motion of the train may be effectually and promptly arrested."

[Printed, 8d. Drawing.]

A.D. 1856, August 23.—N° 1968. (\* \*)

JOHNSON, JOHN HENRY.—(*A communication from Jackson Brothers, Petin, Gaudet and Company.*)—(*Provisional protection only.*)—"Improvements in casting metals."

The invention relates to causing the " chills " used in casting steel articles, such as railway wheels and tyres, to rotate at a high

velocity during the time the molten metal is running into the mould. The chill is shaped internally to the form of the wheel wanted, and fixed to one end of a shaft, which revolves at the rate of 500 to 1,000 revolutions in a minute. The molten steel run into the opening in the cover of the chill is instantly directed by the centrifugal force against the inner circumference of the chill, thus rendering that part of the wheel perfectly sound and homogeneous, and free from flaws. When the chill is full, a mandril that revolves is inserted in the central opening, by which it is smoothed or polished. The mandril is then withdrawn, and a complete cast steel wheel is taken out of the mould. The casting of steel tubes is performed in a similar way, and the tubes removed to the rolling mill are drawn out to any desired extent.

[Printed, 4d. No Drawings.]

A.D. 1856, September 2.—N° 2038.

GUYET, PIERRE JOSEPH.—“ An improved method of stopping  
“ or retarding railway carriages or trains, and of warming the  
“ interior thereof.”

This invention consists, in the first place, in working the brakes of railway trains “ by means of steam brought from the locomotive boiler through a series of tubes extending the whole length of the train, whence it is conveyed by branch pipes into cylinders placed beside or near to the locomotive, and each separate carriage, in which cylinders the steam works pistons fitted therein, the rods of which are connected to levers or arms, which actuate the brakes. The return stroke of the piston is effected by atmospheric air entering through one end of the cylinder, left open for the purpose. The tubes are closed at their further ends by screw plugs, and the connections between the several carriages are effected by short pipes, one end of which is fitted into one end of the next adjoining, and a caoutchouc tube or ferrule is slipped over them, and wire wound over the caoutchouc, whereby the joint is kept steam-tight, while sufficient play is allowed for the curves, reverse, and other movements of the train ; or the coupling may be effected by an equivalent arrangement.”

The patentee states that in order to carry this part of the invention into effect, he prefers “ to place one brake cylinder on each side of the locomotive, to act on and lock the large wheels,

" and to mount a single brake cylinder in connection with a " double lever in the centre of the axle of each carriage;" and he mentions that in connection with the system here proposed of working the brakes by steam, " the carriages are coupled together " by means of the series of tubes which convey steam from the " boiler to the brake cylinders, the series of tubes thus serving " the two-fold purpose of a steam passage and a coupling rod;" the invention including " certain arrangements for adapting those " tubes to the draw or traction springs of the carriages."

The invention is described at some length, and that part of it which relates to conveying the steam along the series of carriages and to the brake cylinder is also made applicable to warming the carriages.

[Printed, 8d. Drawing.]

A.D. 1856, September 5.—N° 2066.

JOHNSON, JOHN.—"Improvements in railway carriages."

One part of this invention relates to locking and unlocking simultaneously the whole or any less number of the doors or wheels of the carriages of a railway train. In order to effect this, apparatus is used which consists of a small hollow shaft or shafts, mounted at the top, sides, or bottom of each carriage, and being of such length as to project about 12 inches beyond each end thereof, these shafts being connected between the several carriages of the train by short flexible tubes and suitable couplings, certain sockets and other mechanism being also contrived for the purpose of causing the junctions of the shafts to accommodate themselves to the varying distances between the carriages. A continuous shaft is thus formed which extends the entire length of the train, which is capable of being turned round in its bearings, and to this shaft the patentee attaches "a screw, pulleys, and cords, or " wires and levers, in connection with spring catches, rising and " falling breaks, bolts, or latches, at the sides, top, or bottom of " the door " of each carriage. The bolts or latches are actuated by the motion of the main shaft, by turning which to the left all the doors on the left side of the train are locked, while on turning it to the right those on the right side are locked. These operations are effected by the use of a moveable screw collar or flange and stop upon the shaft of each carriage, which works in conjunction with a Y or double-armed lever, which, by the turning of the

shaft, is moved first in one direction and then in the other, there being an intermediate position of the shaft in which the doors on both sides of the carriages are unlocked. When pulleys or wires are used they are connected with spring bolts or latches, the pulleys being placed upon hollow spindles, through which the main shaft passes, there being projections on the pulleys and also projections upon the screw collars or flanges on the shaft, so that when the latter is worked to and fro it moves the pulleys, and consequently the bolts or latches, as requisite. The bolts or latches are held in position by springs, these springs being each composed of flanged cups or hollow cones of vulcanized india-rubber inserted into cups or cones of metal or other material. These cups or cones are "hollow-sided," but they may be of other forms, and springs thus constructed may be used for other purposes. Or instead of a spring thus constructed a spring may be composed of a spiral coil of metal combined with a coil of vulcanized india-rubber, a passage being left through the centre for the insertion of a rod or bar. A spring of this description is mentioned as being applicable to the buffers of railway carriages.

The arrangement of shafts and couplings mentioned above may be applied not only to locking and unlocking, but also to opening and closing the doors of railway carriages, racks being attached to such doors, and acted upon by toothed wheels upon or moved by the shaft, spring bolts holding the doors fast when closed. And for locking the wheels of the carriages the patentee uses "mechanism constructed on the same principle."

The hollow shaft is also applicable as a speaking tube, through which the guard and engine-driver may communicate with each other, branch tubes passing therefrom into the carriages, enabling the passengers also to communicate with the guard or driver. And similar apparatus may also be employed to convey hot air from the engine for the purpose of warming the carriages.

[Printed, &c. No Drawings.]

A.D. 1856, September 17.—N<sup>o</sup> 2180.

DAVIES, GEORGE.—(*A communication from Jacob Heberlein.*)—"Improvements in apparatus for actuating railway breaks."

The "principal feature of novelty" in this invention "consists in employing one of the running wheels of the engine or tender, or of a carriage, in the place of human power, for the purpose

“ of applying the breaks to the wheels ” of a railway train, the patentee stating that by this improved arrangement “ the whole “ of the breaks may be brought under the control of one man “ (the engine driver, for instance), ” and that “ the breaks will “ also be automatically applied in the event of the engine leaving “ the rails or becoming detached from the train. ” The breaks consist of “ sliding blocks of wood, connected by rods to levers “ fixed upon a transverse shaft between the wheels, and upon this “ shaft another lever is keyed, to which a rod (running longitudinally under the carriage) is connected. The break so far is of “ the ordinary construction, and it is intended to supply each “ carriage in the train with a similar break. To the above last-mentioned rod is connected a vertical lever, having a fulcrum “ near its lower end attached to the framework of the carriage. “ The upper end of this lever projects above the top of the “ carriage and carries a pulley, round which a cord, belt, wire, or chain passes ; this cord also passes around another pulley attached “ to the upper part of the carriage. At the end of each carriage “ the cord or belt is provided with a hook, buckle, or other simple “ attachment, by means of which the cord or belt of one carriage “ may be connected to that of the next carriage throughout the “ whole length of the train. The cord or belt of the foremost carriage extends to the fore axle of the tender, and its end is secured “ to a small roller or windlass mounted upon a vibrating frame “ and placed immediately below the fore axle. This windlass is “ driven by means of friction pulleys, actuated (when in contact) “ by other friction pulleys fixed upon the fore axle. The frame “ which carries the windlass is raised or lowered by means of a “ chain connected to a weighted lever which rests upon a spring. “ When the engine-driver or other person releases the weighted “ lever from the spring, the lever falls, and raises the windlass “ frame by means of the chain until the friction pulleys are “ brought firmly into contact, and the windlass is thus caused to “ revolve, and by winding up the cord, belt, or chain, to apply “ the breaks to all the wheels throughout the train. Each side of “ the hinder part of the locomotive engine is furnished with a “ stop, which, in the event of the engine leaving the rails, act “ against certain rods connected with the tender, and disconnect “ the coupling of the tender with the train, and at the same time “ release the weighted lever and apply the breaks. ”

[Printed, 8d. Drawing.]



A.D. 1856, September 20.—N° 2208.

VAN HEES, RICHARD.—(*A communication.*)—(*Provisional protection only.*)—"Improvements in the construction of wrought-iron wheels for railway and other purposes."

This invention relates to the manufacture of plate or disc wheels, and consists, firstly, "in rolling the disc and the nave in one piece; secondly, in giving a dished or concave form to the disc, so as to impart elasticity thereto; and, thirdly, in the method of rolling up a rim or flange around the periphery of the disc, for the purpose of attaching the tyre thereto."

"In order to roll the discs with the solid nave in the centre all of one piece, two rollers are employed, an annular groove or indentation being turned in the periphery of each, corresponding in width and depth to the dimensions of the nave. A mass or bloom of wrought iron, properly forged, or of malleable cast iron, produced by any known process, is to be passed (at a proper heat) backwards and forwards between these rollers, the bloom being turned a portion of a revolution each time, and the rollers gradually brought closer together. By this means a circular disc is produced with a solid circular nave or boss in the centre. The disc, which is now flat, is to be turned to the required diameter, and the nave bored out; it is then re-heated and taken to the machine for giving it the dished or curved form, and rolling up the flange. The disc is placed upon a horizontal revolving plate, which is smaller in diameter than the disc by the width of the required flange, the upper surface of the plate or roller being dished out to the required form. The axis of the plate extends upwards through the nave of the disc, which is screwed down by means of a nut until it is held firmly, and the required concavity imparted to the disc. A roller is now brought down upon the upper edge of the disc, and as it revolves is gradually brought from a horizontal into a vertical position, so as to bend or roll up the edge of the disc into the form of a rim or flange at right angles to the disc. The outer circumference of the disc is prevented from getting too cool during this operation by means of a fire, which is in a trough extending nearly around the revolving wheel or plate, and may be blown by a fan or bellows. The wheel is now complete, except the tyre, which is made and fixed to the flange or rim, either by shrinking, rivetting, or any other suitable means."

[Printed, 4d. No Drawings.]

A.D. 1856, September 20.—N° 2216.

SAYER, GEORGE WILLIAM.—(*A communication from Henri Malepart.*)—"Improved machinery for stopping or retarding railway carriages."

According to this invention breaks are provided for acting upon both sides of the carriage wheels at the same time, and when required they may be made to act on all the running wheels of the carriage simultaneously. The breaks are carried in pairs by rigid arms, supported at their ends by means of guides, formed in a rectangular frame which is carried by the axle boxes, and is thus made independent of the carriage framing, and will not be affected by the vertical movements thereof. At the middle of their length these arms are provided with tapped sockets to receive a screw shaft which extends longitudinally under the carriage, and is furnished with right and left handed threads to work in the threaded sockets of the rigid arms, and thereby draw the break blocks against the wheels." The shaft is mounted in bearings in the rectangular frame, and rotary motion is given to it when requisite by means of gearing, and a vertical shaft and fly wheel mounted in the guard's van, or by a ratchet wheel which is turned by a "ratchet hand lever," to which a to-and-fro motion is given by the guard.

"In order to quicken the action of the breaks or increase the power at the command of the guard when the breaks begin to bind upon the wheels, the axle that carries the hand or fly wheel is provided with two sizes of bevil wheels, which take respectively into corresponding wheels on the worm shaft that transmits the motion through a worm wheel to the longitudinal screw shaft. These bevil wheels are fixed to a sliding tube on the hand or fly wheel axle, and they are shifted into and out of gear according to the speed or force required to be transmitted to the longitudinal screw shaft which works the breaks." Each carriage is fitted with similar shafts, arms, and breaks, and the shafts of the several carriages of a train are connected "by square sliding sockets taking on to double-jointed ends," with which the shafts are provided, and the break blocks "are made adjustable in their frames by means of set screws, in order to ensure a uniform bite upon all the wheels of the train of carriages."

"In cases of emergency the axial motion of the screw shaft may be derived from one of the axles of the guard's van or of the

" tender. This is effected by means of a band wheel keyed on the axle of the guard's van or of the tender, and which band wheel, by means of a strap or band, drives another wheel on a shaft carried by the supplementary framing. On this shaft is a worm which takes into a worm wheel keyed on to the longitudinal screw shaft. The driving band is slack when the breaks are not required to act, and by raising or depressing a friction pulley the guard is enabled to tighten the band or bring it to tension, so that it will set the gearing in motion."

[Printed, 1s. Drawings.]

A.D. 1856, September 29.—N° 2272.

JACKSON, LUKE DUNCAN, and MYERS, HENRY.—(*Provisional protection only.*)—"An apparatus for the better working of breaks in stopping railway trains."

The inventors say, in the first place :—"A plate will be attached to the main framework of carriage by bolts; an hydraulic cylinder and ram attached to plate & guide rod; the said guide rod, to be attached to weigh shaft that works the present breaks, with a balance weight on said weigh shaft for sending back the ram; a passage from cylinder to water tank to be opened when thrown out of work, that is, when the train is required to start, the passage is opened by a connection from carriage to carriage instantaneous. A pump is attached to a cylinder of hydraulic, and worked by an eccentric or cam motion attached to wheel or axletree of carriage."

They then state that,—"The principle is, the break is worked by an hydraulic power gained by its own motion or action, that is, of train instead of other means."

[Printed, 4d. No Drawings.]

A.D. 1856, October 7.—N° 2339. (\* \*)

SMITH, THOMAS BRIGGS.—(*Provisional protection only.*)—"Improvements in the permanent way of railways, and in the running of railway carriages."

"In combining with the track now used another track upon which the carriages shall slide, after the manner of sleds, by forming the rail with two tracks, or by using two distinct sets of rails, constructed the one for the wheels' track and the other

“ for the sliding track, whether the set consists of one or more  
 “ tracks ; also in placing the carriages upon runners like sleds ;  
 “ also in the application of compositions or amalgams to form the  
 “ surface of the sliding track and the surface of the runners in  
 “ contact with the track, so that by the mediation of water or other  
 “ suitable lubricator the surfaces shall be made to offer the least  
 “ friction in the passage of the carriage over the track.”

[Printed, 4d. No Drawings.]

A.D. 1856, October 10.—N<sup>o</sup> 2376.

JOHNSON, WILLIAM.—(*A communication from Joseph Juste Chatelain.*)—“ Improvements in railway brakes.”

In this invention brakes are so applied as to be “ capable of  
 “ being used either as self-acting brakes, or of being applied when  
 “ desirable by the guard or attendant of the train.”

The brakes consist of metallic bands or straps, having inside  
 them friction blocks “ which embrace the greater portion of the  
 “ circumference of a large friction drum keyed on to each of the  
 “ axles, if requisite, of the carriages or waggons. The friction  
 “ straps in each carriage or waggon are connected by suitable  
 “ rods or levers, with the same leather strap or chain wound on  
 “ to a small drum placed between the axles carrying the friction  
 “ drums and supported by the main framing.” On the axis of  
 this small drum is a larger drum or pulley, round or over which  
 is passed a strap or an endless chain, the latter passing also around  
 a small pulley placed loosely upon one of the carriage axles.  
 “ This last-mentioned pulley is placed between two discs, which  
 “ are both feathered on to the axle, and are free to slide laterally  
 “ thereon, whilst at the same time they are so arranged as to have  
 “ a rotatory motion therewith. One of these discs is pressed  
 “ against the loose pulley by a helical or other spring, but the  
 “ other disc is perfectly free from pressure until the brakes are  
 “ brought into play.” The outer face of this disc has an incline  
 formed upon it, and is also furnished with a projecting stop, and  
 by the side of this disc is “ a loose or friction disc, which is  
 “ embraced by a small friction strap, brought into play by means  
 “ of a weighted bell-crank lever, connected with a rod which runs  
 “ the entire length of the train, and is connected with all the  
 “ bell-crank levers in the train, the end of the back end of the  
 “ train being fitted with a short length of chain or leather strap,

" which is wound round a small pulley connected with a ratchet  
" and detent." On each side of the loose friction disc is carried  
an anti-friction pulley, one of which runs along the incline on the  
feathered disc when the brake is being put into action, and the  
other bears against and runs over the surface of an abutment  
plate. A projecting stop on the side of the loose friction disc  
corresponds with the stop on the feathered disc already referred  
to, and a second rod " runs the entire length of the train " and is  
under the control of the guard, this rod being connected with the  
detent of the ratchet mentioned above, and serving to raise such  
detent and release such ratchet when moved by a lever which is  
placed for that purpose at one end of the train. " A short length  
" of chain connects this rod with the corresponding one of each  
" carriage, and this chain is passed through an eye in a lever car-  
" ried on one carriage, which is depressed by means of a bar  
" attached to the next carriage when either of these two carriages  
" is elevated by passing over an obstacle on the rails. This depres-  
" sion of the lever tightens the chain which is passed through it,  
" and thereby releases the ratchet, whereupon the small pulley  
" connected therewith is free to admit of the strap or chain on the  
" end of the first-mentioned rod being unwound, and the whole of  
" the weighted bell-crank brake levers come into action and hold  
" the several friction discs firm, affording just sufficient resistance  
" to allow the inclines on the feathered discs to pass over the  
" pullies on the loose discs until the two straps come into con-  
" tact, whereupon the friction disc becomes coupled and turns with  
" the feathered disc, the brake not being made sufficiently powerful  
" to prevent altogether any turning of the loose disc."

The result of these arrangements is that the "action of the  
" incline passing along the anti-friction roller causes the loose  
" strap pulley to be tightly nipped or pressed between the two  
" side discs, and therefore it rotates with them, at the same time  
" winding up or actuating the strap or chain which is connected  
" with the brake pulley between the axles. As this pulley is  
" caused to turn it winds up its strap, and thereby applies the  
" main brakes to the large brake drums, and almost instant-  
" neously stops the train."

The details of the invention are very fully described, but will  
not be clearly understood without the aid of the drawing annexed  
to the Specification.

[Printed, 10d. Drawing.]

A.D. 1856, October 18.—N° 2443.

**DE MIRIMONDE, LEON JOSEPH POMME.**—"Certain improvements in reducing the friction of axles and axletrees of carriages on railways."

According to this invention, which is described in a somewhat confused manner, "friction rollers" constitute the supports of the carriage upon the axle, such rollers being "shaped to correspond with the journal of the axle," bearings being provided in the axle boxes for the axes of the friction rollers, and the patentee thus substituting "rolling for sliding friction."

To each side of the journal of the axle is affixed a ring, to which is connected a band or covering of some suitable flexible material, which material dips into an oil reservoir at the bottom of the axle box, and, being carried round with the axle, keeps up a continuous lubrication of the axes of the friction rollers and the journal of the axle.

The axle box is composed of two parts, the lower of which forms an oil reservoir, the oil being introduced when necessary through an opening which is at other times closed by a spring cover, and the lubrication of the axes of the friction rollers, as well as that of the journal of the axle, is maintained by means of annular bands, which, by means of certain rings and hoops connected with the axle, are made to carry up oil from the reservoir and apply it to the journal of the axle and the axes of the friction rollers.

The patentee mentions, however, a variety of modes in which this lubrication of the axle and of the axes of the rollers may be effected, these including the use of a space in the upper part of the oil box which shall be fed with oil, and the latter be allowed to pass through "longitudinal perforations made in the interior of the axes of each friction roller," some "independent axes" which "penetrate through the friction rollers" being mentioned in connection with this part of the invention; and wicks, permeable fabrics supplied with oil, and acting by capillary attraction, and "pads" being also mentioned as applicable to this part of the invention.

[Printed, &c. Drawing.]

A.D. 1856, October 24.—N° 2503. (\* \*)

**HOLDEN, HOWARD ASHTON.**—"Improvements in furniture for railway and other carriages, and which said improvement



" are also applicable as a means of finishing or ornamenting the  
" iron parts of harness and other articles made of iron, to which  
" such mode of finish or ornamenting has not heretofore been  
" applied."

The patentee claims the invention of coating with enamel or glass all articles " appertaining to the furniture or fittings of carriages or other vehicles, as well as the metallic parts of general carriage and other harness furniture." He does not claim any novelty in the mode of applying enamel to the various articles mentioned in his specification; they may be cleaned with diluted acids, and then coated by the process described in the specification of Thomas and Charles Clark, May 25th, 1839, or in that of Charles Henry Paris, January 23rd, 1849. All angles, edges, or projections must be avoided in shaping the articles, as the coating " is apt to run during the process of firing, and leaves these parts bare."

[Printed, 8d. Drawing.]

A.D. 1856, November 1,—N° 2574.

CURTIS, WILLIAM JOSEPH. — " Improvements in lighting and ventilating railway carriages."

According to this invention, in order to improve the ventilation of the carriage, " the lamp is caused to take its air from the interior of the carriage, and for this purpose a ring of wire gauze or perforated metal is introduced in connection with the glass globe, and in the roof of the carriage a box or case is opened to put the lamp into the opening through the roof, and it is then closed by a lid; from this box a tube runs along the roof of the carriage, and on the ends of the tubes are cowls which turn in the opposite direction to that in which the carriage is running, and thus a partial vacuum is produced in the box or case, and the ventilation of the carriage and the burning of the lamp are improved." And in order further to improve the burning of lamps in which the oil reservoir is placed above the burner the patentee adds thereto " an air tube, which passes from the burner at the point at which the oil should stand therein to the oil vessel, and as the oil vessel is closed at the top the oil cannot descend from it until the end of the air tube becomes uncovered, and thus the overflow of the oil is prevented."

For the mere purpose of ventilation the ventilator may be made to communicate with any suitable part of the carriage. Should

the door of the carriage be opened suddenly a valve connected with the lamp will close, and should the door be suddenly closed a similar effect will be produced, the valve assuming a vertical or hanging position on the air returning to its normal condition, in which position it admits a proper supply of air to the lamp.

[Printed, 10d. Drawing.]

A.D. 1856, November 4.—N° 2585.

**BESSEMER, HENRY.** — “Improvements in the manufacture of “rails, or railway bars, and axles.”

According to this invention a railway axle is formed by placing a rolled bar of tough iron, highly heated, in the centre of an ingot mould, and surrounding it by melted iron or steel, the latter adhering to the bar, and the bar thus forming a core of tough iron running through the centre of the axle, “while the outer “part is made of a different quality of metal,” the essential feature of the invention being the combination of certain peculiar qualities or kinds of iron or steel with iron of another kind or quality. The compound axle, formed as above, may be afterwards hammered or rolled, as may be requisite. The invention is set forth at some length; and the patentee claims particularly:—

Firstly, the manufacture of rails and railway axles by uniting or combining together iron which has been rendered malleable by the process of puddling with steel obtained by the partial decarbonization of crude or cast iron without the process of puddling or recarbonization by cementing.

Secondly, forming a rail or axle by uniting and rolling together iron that has been previously rolled with another portion of iron or steel or semi-steel in a cast and unrolled condition.

Thirdly, forming rails and axles by combining iron rendered malleable by puddling with iron, steel, or semi-steel rendered from crude or cast iron into a malleable metal by currents of air or steam, and formed into an ingot or mass while in a fluid state.

Fourthly, uniting a solid bar of iron with another quality of iron, steel, or semi-steel in a fluid state for the purpose of forming railway bars or axles.

[Printed, 4d. No Drawings.]

A.D. 1856, November 12.—N° 2659.

LUKYN, WILLIAM, the elder.—“A buffer break for railway carriages or trucks attached to locomotive engines, whether one or more engines, for the conveyance of goods or passengers.”

According to this invention, in stopping a railway train, “the fireman having put on the break in the ordinary manner, the impetus of the train forces itself upon the tender, thereby causing the buffers to recede.”

The patentee apparently means that the motion of the engine or engines and tender of a train shall be retarded by ordinary means, the impetus of the rest of the train then causing the breaks of the carriages to be brought into action through the medium of the buffers. To each buffer rod is connected one end of a short spiral spring, the other end of this being connected, by means of certain levers, with a break block, the result of this being that on the buffer rods being pressed inwards the break blocks are pressed against the wheels. Strong spiral springs placed around the buffer rods restore them to their first position on being set at liberty, and in order to provide for shunting or backing the train certain “stop blocks” are so arranged as to be brought into action upon the buffer rods in such manner as to prevent them from acting upon the breaks while such shunting or backing is being performed, these stop blocks being actuated through the medium of certain levers and longitudinal rods, one of the latter being under each carriage, and the rod of one carriage being connected with that of another by links and a spring box, and the whole being brought into action at pleasure by means of a lever handle.

[Printed, 10*l*. Drawing.]

A.D. 1856, November 14.—N° 2686.

EMERY, RICHARD.—“Improvements in springs for carriages and other vehicles.”

This invention relates to the construction of “leaf springs,” and consists in “placing between each leaf of steel a thin sheet of metal or any other material,” the patentee stating, however, such material to be either zinc, copper, tin, or compounds thereof, “or any other metals which may be compounded that may effect the same object,” which is to prevent the different leaves of

steel from coming into contact and becoming corroded, the metal or compound between the leaves "keeping up while in contact a " galvanic action which tends to throw off and prevent oxygen " from acting on the steel."

The invention is set forth in detail as applied to an ordinary carriage spring," and also to a "strong spring for " railway carriages and locomotive engines," the steel plates being in each case furnished with small slots or grooves into which small projections from the intermediate compound or other plates enter, thus keeping them together; the whole being otherwise secured together in the ordinary manner.

[Printed, &c. Drawing.]

A.D. 1856, November 14.—N° 2691.

SUTHERLAND, JOHN.—"An improved railway break."

The object of this invention is to dispense with the ordinary break blocks and their accompanying apparatus, and the invention consists in the use of friction drums or barrels, one of which is securely attached (between the wheels) to each of the ordinary running axles of a carriage. "These friction drums are so placed " on the several axles as to be situated in a direct line with each " other, and each of them is acted upon by a friction strap or band " of metal, which encompasses a greater part of its circumference, " and has one of its ends attached to the framing of the carriage, " the other end being fixed to a square or other suitable rod or " bar running parallel to the line of drums. At one end or other " part of the rod or bar is formed or attached a screw, which " passes through a corresponding nut formed in a worm wheel " (confined from moving endwise, but free to revolve), actuated " by a worm or endless screw fixed on a vertical shaft, having on " its upper end an ordinary lever or winch handle to be worked " by the guard or breaksman in the ordinary manner," the turning of this handle causing the worm and worm wheel to revolve and the rod or bar to be drawn backward through the nut of the latter, and consequently to tighten the friction straps upon their respective drums, and thus retard or stop the revolution of the axles and wheels. "The rod or bar before mentioned " is connected by means of a lever or otherwise with an index or " pointer, showing the extent of its motion and the consequent " tension put upon the straps."

Different modifications of the details of the invention are described.

[Printed, 1s. Drawings.]

A.D. 1856, November 18.—N<sup>o</sup> 2719.

WILSON, JOHN.—“Improvements in springs for railway and “other carriages.”

This invention consists, firstly, in making springs for carriages of steel, having a curved or convex figure in its cross section, instead of the flat steel ordinarily used. Various modes of carrying out the invention are described, in some cases the curvature extending entirely across the plates, while in other cases the middle parts only are curved, the parts on each side being flat, and being in some instances thicker at the edges than elsewhere, and the plates composing the spring thus only touching at their thicker parts. In other cases one side of each plate is flat and the other concave.

Another part of the invention consists in constructing springs of plates which have not only the curvature described above but also another curvature extending from the middle to each end of each plate; and in constructing bearing springs, especially those of railway carriages, the patentee forms each spring of plates of different degrees of curvature, the lowest plate having a curve of greater radius than that next above it, and the radii of the curves of the other plates diminishing in like manner, the result of this being that on pressure being applied to the spring the plates act upon each other in succession. If desired, plates of which the section forms a semi-polygon, may be used, and the invention may be applied in the construction of buffer as well as bearing and other springs.

Another part of the invention relates to “a new spring for “such carriages as are without a perch.”

The main portion of this spring is of the usual construction, the principal feature of this part of the invention being the use of a curved rod which supports the body of the vehicle, and to which the two ends of the spring are connected by links, jointed thereto and to the curved rod respectively.

[Printed, 8d. Drawing.]

A.D. 1856, November 20.—N° 2752.

**EATON, RICHARD.**—"Improvements in apparatus for buffing  
" on railways, and for other purposes."

This invention consists, firstly, in apparatus for preventing the injurious recoil of buffers, which is effected by the application of palls, levers, or wedges, "which are pressed by the force which  
" acts upon the buffers into a series of inclined planes, notches,  
" or oblique or spiral grooves or rims, formed upon the interior  
" or exterior of the buffer case, and thus serve to retard the return  
" or recoil of the spring."

Secondly, the invention consists in the use of one or more columns of short or small parallel or conical spirals, or of small volute springs, either in a single group, or placed one above another with intervening plates, the said plates being provided with suitable bosses, rims, or guide spindles for preserving the proper relative positions of the several springs. "The number,  
" strength, and elasticity of such spirals or volutes, as well as  
" the peculiar shape of section, can be readily adjusted to suit  
" any required purpose, as bearing, buffing, traction, and lifting  
" springs."

Thirdly, the invention consists in certain modes of forming springs of thin vulcanized india-rubber or gutta percha, or their compounds, in combination with or not in combination with spiral or volute steel springs. The india-rubber may be in plates or strips of any requisite shape, and they may be arranged singly between the intervening plates, or two or more layers may be arranged upon plates made of convenient size to admit them, and there may be either one or more guide spindles to retain the same. In some cases the surfaces of the india-rubber, or of the plates, or of both, may be "ribbed, undulated, embossed, or perforated, so as to obtain various degrees of sustaining power or  
" elasticity, and to attain the same object the thickness and  
" densities of the plates of the india-rubber may be varied in the  
" same spring."

The invention is set forth under various modifications.

[Printed, 1s. Drawing.]

A.D. 1856, November 21.—N° 2763.

**BARRANS, JOSEPH.**—"Improvements in apparatus for applying oil or lubricating fluid to the axles of railway carriages and  
" locomotive engines."



In this invention "an oil box or vessel is formed in or applied to an axletree box, in which one or more rotating surfaces are used; it is preferred to have a cylinder or cylinders on a suitable axis, which by their revolution bring up the oil or lubricating material to the under surface of the axle, and they apply such fluid to the under surface of the axle." The vessel or box containing the lubricating material is provided with a cover, through which an opening or openings may be made, the cylinder or cylinders passing through such opening or openings, this cover acting as a doctor or scraper, and at the same time preventing the oil or other lubricating fluid from splashing, "and when using more than one cylinder it is preferred to employ dividing plates in the vessel, to prevent the fluid being thrown towards one end of the vessel," the cylinder or cylinders being pressed up to the axle by a spring or springs, or other suitable apparatus.

In order to prevent the escape of lubricating matter from the box, as well as the access of dust or dirt thereto, a ring of metal is placed around the axle, such ring being in two parts, one of which rests on the axle while the other is pressed up thereto by a spring, and a "stop" is used "for adjusting the end play of the axletree," this being kept in position by a set screw.

[Printed, 6d. Drawing.]

A.D. 1856, November 22.—N<sup>o</sup> 2779.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Certain improvements in railway carriages."

This invention is described at considerable length, but the leading features thereof consist,—

Firstly, in constructing the bodies of railway carriages "with the sides of wrought-iron lattice or other open work, combined with the floor frames and uprights."

Secondly, in the employment, in the construction of the sides of railway carriages, "of wrought-iron latticework, covered in its interior or exterior, or on both interior and exterior, first, with felt or other non-conducting material, and then with oilcloth, painted canvas, or other waterproof material."

Thirdly, in "the combination with a latticework floor of a close receptacle below the floor to collect the dirt from the passenger's feet," and provided with a trap or traps "to let out the dirt when and at any place desired."

Fourthly, in a mode of constructing, applying, and operating certain moveable flanged guide wheels, in combination with plain supporting wheels, so as "to allow the carriage to run on or off the rails at the pleasure of the conductor or person in charge." The bearing wheels of the carriage have plain tyres, without flanges, and the guide wheels have their flanges in the middle of their tyres, these guide wheels being intended to work upon grooved rails, and each guide wheel is mounted at one end of a lever, the other end of which is supported by a fulcrum fixed to the carriage frame, chains being connected to these levers and passing to a capstan mounted at one end of the carriage, by turning which the wheels may either be lowered into contact with the rails or be raised therefrom. Narrow scrapers are provided for the purpose of removing loose obstructions from the grooves in the rails; but frozen ice or snow may be removed by the use of guide wheels having "teethed flanches."

This invention seems to relate more particularly to carriages and rails for use in streets and on ordinary roads. The grooves in the rails are sufficiently narrow to prevent the bearing wheels of any vehicles from entering them, and the rails themselves are so laid that their upper surfaces are level with the surface of the street or road, thus offering no obstruction to ordinary traffic.

[Printed, 1s. Drawing.]

A.D. 1856, December 1.—N<sup>o</sup> 2834.

GILKS, CHARLES HENRY.—(*Provisional protection only*).—

"An improved stand for umbrellas for railway and other carriages."

This invention consists in the use of a stand or vessel for the reception of wet umbrellas, so constructed as readily to be "attached to a railway or other carriage door without encroaching on the space allotted to passengers." To the door of the carriage are applied two studs or other fastenings, and the stand is slotted so as to fit upon these studs. The sides of the stand are bevilled off so as not to incommode passengers, the stand itself being made of galvanized iron or other suitable material, perforated at the bottom, and communicating with an outlet from the carriage for the drippings from the umbrellas.

[Printed, 4s. No Drawings.]

A.D. 1856, December 1.—N<sup>o</sup> 2836.

**GEDGE, JOHN.**—(*A communication from A. Macpherson.*)—"Improvements in lubricating the journals of the axles of railway vehicles or other moving parts of machinery."

The object of this invention is "to secure the lubrication of the journals of the axles of railway vehicles by the use of oil or other liquid lubricating material, without the necessity of charging the entire hollow portion of the base with oil (which, nevertheless, may be done if found desirable), but securing the lubrication of said journals so long as any portion of the oil shall remain in the reservoir, and fully preventing said oil from thickening or becoming semi-solidified with some modification of little cost."

An arrangement is described in which an oil vessel is placed below the journal of a railway axle, the oil, however, not reaching to the axle. A pin is fixed in the end of the axle, but not concentric therewith, and this pin is made, as the axle revolves, to give a to-and-fro motion to a small lever, mounted on a fulcrum carried by the oil vessel, and having jointed thereto a pawl, which by the to-and-fro motion of the lever is made to turn a ratchet wheel fixed on a small shaft on which are mounted brushes, these, as the shaft rotates, carrying up oil from the vessel to the journal of the axle. The brushes may be varied in size and form, as also the speed of their rotation; and, if desirable, "leather, felt, cotton, or other substance capable of lifting oil either by adhesion or capillary attraction" may be used instead of brushes. The patentee states that he proposes, with some modifications, to apply the principle of the invention to other moving parts of machinery, "travelling on bearings," but he does not describe any such application.

[Printed, 6d. Drawing.]

A.D. 1856, December 1.—N<sup>o</sup> 2839.

**GIBSON, JOHN.**—"Improvements in buffing and drawing apparatus."

This invention consists "in constructing buffing and drawing apparatus with a combination of two or more spiral, helical, or coil springs, disposed at equal or other suitable distances from

"the axis or centre line of the buffer or draw bar, and at equal  
 "or other suitable distances from each other," instead of being  
 placed upon the buffer or draw bar, as ordinarily practised; and,  
 further, "in constructing buffing apparatus "of two principal  
 "cylinders or parts forming telescope cases for buffing springs,"  
 one of such parts being furnished with one or more snugs or pro-  
 jections, and the other with one or more grooves, channels, or  
 notches, the snug or snugs on the one, and the groove or grooves  
 on the other, being so disposed that "one of the said cylinders  
 "or parts may be placed in or upon the other cylinder or part,  
 "when fixed or secured to a carriage (the snug or snugs passing  
 "through the groove or grooves), and slightly turned round  
 "within or upon the other part, and while holding them together  
 "allow of the necessary sliding or movement of the one part in  
 "or upon the other, and, on being turned back again, allow of  
 "the one part being removed from the other without taking off  
 "or removing either part from the carriage."

The invention is described under various modifications, in some cases two, in others four, and in other cases six coiled springs being used. Draw springs are described (for example) in which two coiled springs are used, these being placed upon two U-shaped or forked rods, which pass not only through the springs but also through iron plates, between which the compression of the springs takes place, the loops of the rods being presented in opposite directions, and the coils being secured by nuts. In another case a buffing arrangement is provided with two coiled springs, one being placed on each side of the buffer rod, and the latter having attached to it a plate to which rods are bolted, such rods passing through the springs and also through another plate fixed to the framing of the carriage.

The various modifications of which the invention is susceptible will, however, only be fully understood with the aid of the drawings annexed to the specification.

[Printed, 1s. 4d. Drawings.]

A.D. 1856, December 5.—N° 2892.

OGDEN, HETH, and HIBBERT, HENRY.—"Improvements  
 "applicable to colliery and locomotive engines, for the purpose  
 "of arresting or retarding their motion at required intervals, and  
 "of indicating the amount of work done in relation to such  
 "intervals."

As regards locomotive engines this invention consists in mounting a worm on the trail axle, which, through the medium of a worm wheel, communicates motion to an upright shaft, there being upon this another worm, taking into a wheel fixed upon the axis of a disc, the latter being thereby caused slowly to revolve. Upon the axis of the disc is mounted a lever, which by means of a nut and screw may be made to assume any required position with reference to the disc. Upon a fixed centre, separate from that of the disc, is mounted a lever, the end of this lever being situated beneath a certain hand lever, connected with the slide valve rod of an auxiliary steam cylinder. the piston rod of which extends downwards, and is connected by a lever to a break of any ordinary construction. The face of the disc is marked with divisions corresponding to the miles over which the trail wheel will travel, "or the names of the stations at which the engine is to stop are inscribed thereon." Upon starting the engineer moves the hand lever around its axle until it is opposite to the name of the station at which it is to stop, or the number of miles the train is to travel before stopping, and then makes the lever fast in that position by means of a nut provided for the purpose. The arrangement is such that upon the "determined distance" having been travelled over, steam will be admitted into the auxiliary steam cylinder, the piston of which, through the medium of suitable mechanism, then causes the breaks to be applied to the wheels of the carriages. Suitable arrangements are provided for enabling the steam to be cut off from the auxiliary steam cylinder when the breaks are no longer required to act.

The patentees mention that as the disc revolves with an uniform speed, the engineer may, by inspecting the condition of the lever combined therewith, "ascertain at any time his position on the line, should he be unacquainted with the locality, or in case of foggy weather."

The other parts of the invention do not require notice here.

[Printed, 10d. Drawings.]

A.D. 1856, December 6.—N<sup>o</sup> 2893.

HOOPER, WILLIAM, FRY, JOSEPH, and NASMYTH, GEORGE.  
—"Improvements in springs for railway carriages, and for other purposes."

This invention relates to certain applications of vulcanized india-rubber. The patentees state that they "take tubes of vulcanized, mineralized, or otherwise permanently elasticated india-rubber of a suitable diameter and thickness," or sections of tubes or cylinders or rings, either of circular, square, or other section, and apply them either singly or in combination, "in such a manner that the elasticity is produced by the compression of the cylinders, tubes, or rings in the direction of its or of their diameter," and where several tubes or cylinders are combined the variation of the position of the parts of the several rings, or of the extent of their surfaces in contact, will give varying or increasing degrees of resistance and of elasticity. When rings or grommets are required for purposes where small force only is required, the patentees take "short lengths of strong tubing, and turn it round and join the ends together, and thus form rings. These springs are fitted into cases, or confined between two side surfaces. These forms of vulcanized, mineralized, or otherwise permanently elasticated india-rubber articles" may be applied for the "bearing, drawing, or buffing springs of railway carriages," as well as for other purposes "where either a long or a short action, and where the introduction of a governable or controllable elastic body of a permanent character are desirable."

Various modes of applying the invention are set forth.

[Printed, 10d. Drawing.]

A.D. 1856, December 8.—N<sup>o</sup> 2905.

EATON, RICHARD.—"An improvement in the manufacture of springs when india-rubber is used."

The essential feature of this invention consists in the construction of laminated springs of thin vulcanized india-rubber, kept separate by metal plates or divisions, "the vulcanized india-rubber not exceeding half an inch in thickness," the patentee stating that the invention is founded upon a peculiar property which he has discovered in regard to vulcanized india-rubber, this being that sheets of less thickness than half an inch will sustain greater weight and still offer the requisite elasticity for a spring than if the whole quantity employed be in one mass, or subdivided into sheets of half an inch or more in thickness, "hence the advantage of dividing each half inch of india-rubber used in a spring into several parts," each two parts being separated by a plate of



metal. By this arrangement springs of a given or requisite force may be made to occupy less space than heretofore, requiring, moreover, considerably less india-rubber.

The invention is set forth as being applied in various modes and to various purposes, including bearing and buffer springs for railway engines and carriages, and also bearing springs for carriages for common roads.

In one arrangement a bearing spring for a railway engine is composed of three sets of sheets of india-rubber having plates of metal between them, one set being placed below and the other two above the axle bearing, central spindles passing through both plates and sheets, and certain rods, bars, and other appendages, distributing the weight of the engine among the three sets. In another case two sets only are used, one being above and the other below the axle, the object of the lower spring in each case being to prevent any sudden recoil of the upper spring or springs. In other cases, bearing springs for waggons or carriages on railways are composed of a set of sheets and plates at each side of each axle bearing; in other cases, again, one set only being placed above such a bearing. In another case one set is placed vertically above the bearing, and two other sets arranged horizontally, the latter being provided with caps and diagonal bars, which connect the caps to the axle box. Similar arrangements are also applied to the buffer and draw springs of railway vehicles, and also to the bearing springs of carriages for common roads; in some cases sets of sheets and plates with central rods passing through them only being employed, while in other cases such sets are used in combination with oblong plates of steel of different lengths, having corresponding pieces of india-rubber between them. Sets of sheets and plates with central spindles may also be used as "cushion springs" for the ends of the ordinary steel springs of railway engines and carriages, as well as for those of ordinary carriages; and the invention is set forth as being applicable to the buffers and lifting springs of the hoisting cages used in coal mines, to the standing rigging and cables of ships, and to hoisting and towing purposes in general.

[Printed, 10d. Drawing.]

A.D. 1856, December 15.—N<sup>o</sup> 2972.

JACKSON, LUKE DUNCAN.—(*Provisional protection only.*)—  
"A pneumatic break or apparatus to be attached to railway

"carriages or trucks for the purpose of retarding or stopping the same."

In this invention, which is very clumsily and imperfectly described, the breaks "are worked by a cam or eccentric fixed on the axle of the carriage," which when put into gear, and so long as the axle turns, works a pump, "which forces the breaks powerfully against the wheels of the carriages or trucks until they are stopped. To effect this, an arrangement of machinery is placed either on the block bar, or under the bottom of the carriage, consisting of a cylinder, piston, and rod, connected by means of a lever and links. To the present way shaft a pump or air pump is connected to cylinder to condense or compress air into the cylinder to force the piston attached to the lever on the way shaft. The pump or air pump is worked by a link, chuck, or other means, attached to a lever from a cam or eccentric, which, when put in gear, is worked by the rotative action of the axletree." The inventor mentions forming a connection from one end of the train to another by means of a square linked chain between the carriages or trucks, the links being made "sufficiently long to allow for elongation between the carriages," this being apparently meant to enable the guard, driver, or stoker at once to bring the whole of the breaks into operation, the driver or stoker being also thus enabled to ring a bell in the guard's carriage.

[Printed, 4d. No Drawings.]

A.D. 1856, December 18.—N° 3002.

FAY, CHARLES.—"Improvements in railway carriages and breaks."

This invention relates, firstly, to certain arrangements of mechanism for actuating the breaks of railway carriages, "whereby the whole of the carriage wheels throughout the train may be simultaneously broken, if found desirable, with the greatest ease and rapidity," and, secondly, "to certain improved modes of attaching or hanging the bearing springs and axle boxes of railway carriages, so as to allow for the free play of the axles in passing over curves."

According to the first part of the invention each carriage is furnished with a longitudinal break rod, turning in bearings attached to the under side of the carriage framing. The ends of these rods are tubular, and in these tubular portions are fitted

correspondingly shaped rods which are jointed by universal rods to a central link, which thus forms the connection between the break rods of the contiguous carriages. "It will thus be obvious that a rotatory motion imparted to the break rod of one of the carriages will be transmitted to all the rest throughout the entire length of the train." This motion may be derived from a pair of bevil wheels, or a screw and worm wheel, and an "eccentric arrangement" may be used for engaging or disengaging any one of the screws or worms with or from the worm wheels when desired, "either from the under side, inside, or roof of the carriage. The upright shaft which carries the screw is thrown out of the centre of the carriage whilst the longitudinal breaks or shafts are placed in the centre of the carriage framing, by which means the draw rods which are placed above are not interfered with."

Various mechanical means may be adopted for transmitting motion from the break rods to the break blocks. According to one arrangement, "the break rod has a worm upon it which gears into a toothed segment on a transverse rocking shaft. This shaft carries two short lever arms, which are connected by rods to the backs of the two inner hanging break blocks, the outer blocks being so connected with the inner ones that such pair of blocks will nip their respective wheels simultaneously on opposite sides of their peripheries. The same arrangement of actuating mechanism is equally applicable to the slide break when attached to the axle guards." Or, in place of the segment, a worm wheel may be used "on a short shaft of its own, such worm wheel being connected by a pin and link to a lever arm on the transverse rocking shaft above referred to. The motion from this shaft is imparted to the ordinary sliding breaks by rods connected with short lever arms on the working shaft. The connecting link above referred to, from the worm wheel to the lever arm, is for the purpose of allowing for the play between the carriage framing and the sliding blocks which are connected with the axle boxes."

The second part of the invention consists in "connecting the tension bar of the bearing springs of carriages or other rolling stock of railways at each end by a rod or rods to the carriage, and also in the use of springs, compensating levers, and tension rods, to allow of the axles adjusting themselves longitudinally and laterally, and permit the carriages to run freely

"round curves." In carrying out this part of the invention the tension bar of the bearing springs may be attached at each extremity to a chain which is passed round a pulley, these two chains being united by a connecting link or tension rod. To allow for longitudinal play to the carriage, a steel spring is inserted in a sliding box fixed between the axle guards, against which spring the side of the axle box will press when passing over curves, so that the axle may be capable of adjusting itself laterally to the radius."

The details of the invention are set forth at some length, and under various modifications.

[Printed, 2s. 10d. Drawings.]

1856, December 22.—N° 3025.

LANG, LOUIS ANTOINE.—(*Provisional protection only.*)—"A new system of rotatory motion for all kinds of vehicles."

According to this system the inventor supports the body or frame of the vehicle upon "the exterior part of the nave of the wheel" instead of upon the axle. To effect this the more readily it is desirable that the naves of the wheels should be made larger and stronger than usual, and they should also be furnished with a cylindrical hoop or band of iron or other material, "which may be plain, toothed, or notched, and provided with a flange or projection at each end," and the frame or body of the vehicle is furnished underneath, on both sides, with a strong box or bracket in which is fitted a roller or pinion, plain, toothed, or notched in correspondence with the hoops or bands on the nave. The body or frame of the vehicle thus rests upon the axes of the rollers or pinions, these again being in gear or contact with the hoops or bands on the naves of the wheels, and rotating therewith. The box or bracket containing the roller or pinion may either be placed perpendicularly to or with a slight obliquity to the nave, and the axes of the roller or pinion may be furnished with a finger or catch which may fall when required into the teeth of the nave, or into those of a ratchet wheel connected therewith, thus stopping the rotation of the wheel; or a break may be applied to both roller and nave for the same purpose.

The invention is mentioned as being applicable to all kinds of vehicles, "whether worked by manual, horse, steam, or other power."

[Printed, 4d. No Drawings.]

A.D. 1856, December 22.—N° 3035.

SMITH, WILLIAM.—(*A communication from J. B. Humphreys.*)—  
“Certain improvements in railway rolling stock.”

According to one part of this invention, instead of using locomotive engines of great power for actuating the carriages or waggons of a railway train, “a series of trucks are each fitted with “steam engine cylinders, by the action of the steam in which “motion is communicated to the wheels of such trucks or carriages,” the steam necessary for communicating such power being communicated either from the boiler of a locomotive traction engine in front of the train, by means of suitable steam pipes, or from a separate boiler or boilers mounted upon a truck or trucks, and arranged in a suitable manner for the purpose. The wheels of these trucks may either be driven separately or in combination, various arrangements of connecting rods and other mechanism being set forth as applicable to the purposes of the invention, one arrangement being mentioned in which the hind wheels of each truck are worked by a “steam-propelling” contrivance, the connecting rods which couple the wheels being provided with brasses or eyes which “permit of oscillation or motion between the bogies “upon which the goods platform, truck, or passengers’ carriage “is laid or mounted,” and as a provision for enabling such trucks to traverse curves in the rails self-acting or regulating bars may be provided, by which the quantity of steam admitted to the cylinders of the several trucks may be increased or diminished in proportion to the curve traversed, and the rotation of the wheels thereby regulated. Such arrangements may also be made to serve the purpose of breaks, the steam being directed so as to reverse or slacken the rotation of the wheels, and in order to prevent accidents, and for the purpose of controlling the movement of the trucks, certain rods are so arranged that the steam may be shut off from any of the trucks at pleasure.

The invention is set forth at considerable length, trucks with four and trucks with two wheels being used according to circumstances, in some cases a train of such trucks having “a vertebra-like connection and action,” whereby buffing apparatus, draw rods, links, and coupling chains are rendered unnecessary.

Those parts of this invention which relate to locomotive engines are noticed in another series of Abridgments.

[Printed, 1s. 4d. Drawings.]

A.D. 1856, December 26.—N° 3061.

HOSTEIN, JACQUES ainé.—(*Provisional protection only.*)—  
“An improved mechanism for stopping railway trains.”

In this invention a horizontal bar passing from axle to axle of a railway carriage has upon it sliding break blocks, capable of being pressed against the inner parts of the wheels, through the medium of an arrangement of bars and levers, one of which projects upwards, and is moved to and fro when requisite by means of a sliding piece, having connected to it a rack. This rack is in gear with a spur wheel mounted in a moveable frame, and by means of a screw and a hand wheel, this moveable frame can be drawn into such a position as to bring the spur wheel, carried thereby, into gear with a spur wheel on one of the axles of the carriage, the result being that the rack and sliding piece are caused to operate upon the levers and bars which apply the breaks, while on the moveable frame being restored to its first position, and the spur wheels again placed out of gear, the bars and levers fall into their first position also, and remove the breaks from the wheels of the carriage. The invention may be applied to locomotive engines as well as carriages.

[Printed, &c. Drawing.]

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## 1857.

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A.D. 1857, January 1.—N° 7.

MABERLY, FREDERICK HERBERT.—“Improvements in the  
“construction of wheeled carriages.”

This invention is set forth at some length, and consists in the first place in bringing down the bodies of carriages “nearly to the ground,” so as to admit of seats on the roof, as in the case of omnibuses, for example, having a covering placed over them without the structure rising to an excessive and dangerous height. Such a covering is described as consisting of “spring roller water-tight blinds placed so that they may be drawn down in the proper direction for sheltering the passengers,” and so as to “shoot off the water” in case of rain. These roller blinds extend the whole length of the vehicle if the seats are placed



lengthwise," but otherwise if the seats are otherwise, and are so arranged as to be "momentarily" drawn down and drawn back. The roofs of omnibuses are mentioned as being "made" moveable in the whole or part by throwing one part of the "roof back on the other," a water-tight leather joint and a small strip of leather round the parts at which the opening is made effectually excluding both wet and cold air. Any carriage may by this means be converted at pleasure from an open to an enclosed carriage.

Another part of the invention consists in "bringing the wheels" within the carriage" in such a manner "that there is a plane" side to the carriage divested of all fear of wheels in getting in "or out," and of "dirt or danger," the sides of such carriages being protected by "wooden pieces plated with iron, or by iron" alone, passing along the sides laterally, and fixed to the "same."

Another part of the invention consists in the application of spiral springs as bearing springs for carriages, instead of the springs ordinarily used, bolts within "pipe boxes" passing through such spiral springs and preventing too much play of and too much strain being thrown upon such springs.

A mode of "fixing a two-wheeled cab to its axle" by means of what the patentee terms a "barrow spring," with "a superadded" spiral one," is described, by which means the vehicle "may be" placed backwards or forward with the driver's seat in front, and "the doors to the same opened either before the wheels or behind" them (or at the back by the use of short axles)," "whereby the" balance of the carriage may be preserved."

Another part of the invention consists of a hinge suitable for carriage doors, and is particularly applicable to the doors of railway carriages, one object of this part of the invention being to prevent injury to passengers by "the forcible shutting of the door," this hinge consisting essentially of a long fixed pin, around which a strip of copper or other metal is coiled, while the side of the door opposite to the hinge is "packed," as well as the post or frame "against which it shuts."

[Printed, 8d. Drawing.]

A.D. 1857, January 3.—No 30.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Certain improvements in the means of connecting, accumulating,

“retaining, and applying reserved power for the application of  
“railway brakes in sudden emergencies.”

According to this invention, a vertical shaft is mounted in suitable bearings, and has coiled around its lower part a chain, which, on the shaft being turned in one direction by means of a hand wheel at its upper end, brings the brakes (which are of the ordinary character) into action, which brakes may be again placed out of action by turning the shaft in the contrary direction. This part of the arrangement serves for ordinary purposes, but in order to provide for sudden emergencies, a hollow drum is mounted loosely upon a sleeve carried by the shaft, there being on the upper part of the drum ratchet teeth, with which a pawl gears, which is mounted upon an arm fixed to the shaft, and at the lower part of the drum other ratchet teeth, which have also a pawl gearing with them, but this pawl being mounted on a pivot carried by a fixed cross bar. The result of this part of the arrangement is, that on the shaft being turned, as first mentioned, the pawl carried by the fixed arm turns round the drum also and winds up a helical or convolute spring, which is inside the drum, the drum being prevented from turning backwards by the pawl, which works along with the lower ratchet teeth. A “reserved power” is thus obtained, which may be used, upon a sudden emergency arising, so as to cause an instantaneous application of the brakes, this being effected by pulling a cord, which liberates the pawl from the lower ratchet teeth, thus allowing the spring to suddenly uncoil, and, through the medium of the upper ratchet teeth and the pawl carried by the arm on the shaft, to turn the latter, and, through the medium of the chain on the lower part of the shaft, already mentioned, to at once apply the brakes.

[Printed, &c. Drawing.]

A.D. 1857, January 7.—N° 60.

CURTIS, WILLIAM JOSEPH.—(*Provisional protection only.*)—  
“Improvements in railway axletree boxes.”

This invention is intended to prevent “the passage of the  
“grease out of the axletree box,” and also the entry of dust and dirt into such box, and consists in fixing by its outer edges or circumference, to the box, a disc or plate of flexible material, such as leather, vulcanized india-rubber, or other suitable material, the axletree passing through the centre of the disc. The latter,  
“where it embraces the axletree, is arranged to fit closely to the

" axle (by its own elasticity or by a collar), and yet admit of the  
" axletree turning freely therein, and provision is made to prevent  
" the part of the disc which embraces the axletree moving  
" round " with such axletree. It is not stated in what this  
" provision " consists.

[Printed, 4d. No Drawings.]

A.D. 1857, January 10.—N° 86.

KYLE, DAVID DUNNE.—" A method of retarding or stopping  
" railway trains and carriages, applicable also to carriages on  
" common roads."

In this invention the body of a railway carriage is so arranged as to be capable of being slightly raised, and the weight thereof brought to bear upon certain wheels called " secondary wheels," which are much smaller than the bearing wheels of the carriage, and act against them so as to constitute breaks. The body of the carriage may be raised in order to bring the apparatus into action by means of a lever, furnished at one end with a kind of cam; or by a screw furnished with a pinion, the latter being in gear with a toothed segment attached to a horizontal arm, such lever or arm being either moved by hand, or, if desirable, by inclines or blocks or bars placed in the line of railway. Or a drum or drums may be mounted upon the engine or in one of the carriages of a train, and, by means of ropes or wire stands, be made to apply the breaks of all the carriages of the train simultaneously.

The invention is described in a somewhat confused manner, some of the details being by no means clearly set forth. The patentee mentions that instead of the " secondary wheels " breaks of the ordinary character may be used, or the two combined together; that the secondary wheels may either constantly revolve in contact with the carriage wheels (whether the weight of the body of the latter be resting upon them or otherwise), or may be " held " at rest " until required to act as breaks; that they may be kept in contact with the wheels of the carriage by the use of rods and springs passing from the axes of the wheels to those of the break rollers; and that they may otherwise, if desired, be mounted on the ends of levers, by which means they may be " directed against " any portions or points of the carriage wheels."

In applying the invention to carriages for common roads, arrangements similar to those mentioned above may be used, or

the axes of the secondary wheels may be so arranged as to move in curved slots, in such manner as to be brought when desirable from behind the wheels (where they act as breaks) to the front of such wheels, when they might be used to assist the progress of the vehicle up a steep hill or "incline."

[Printed, 8d. Drawing.]

A.D. 1857, January 14.—N° 115. (\* \*)

DEMANET, JEAN BAPTISTE VICTOR.—(*Provisional protection only.*)—"Preventing accidents on railways." The following is the whole description of this invention given in the Provisional Specification. "Apparatus going backward and preventing the shock when the collision takes place to warn the engine's driver, the man at the brake, and untight the train. Each train must be provided with an apparatus called 'advertiser.' It can be made of any length to 500 yards, more or less. All the pieces are made of solid iron. The apparatus is attached to the locomotive engine, and can be detached in few minutes, and then attached to another. The apparatus does not require any alteration in the present system of railways or locomotive engines."

[Printed, 4d. No Drawings.]

A.D. 1857, January 19.—N° 154.

HASWELL, JOHN. — "Improvements in the construction of railway carriages, which improvements are also applicable to locomotive steam engines."

This invention has for its object, in the first place, "to equally distribute the weight of the carriage or engine upon the axle boxes, and to render it impossible to increase the weight by screwing down any of the springs, or by placing more weight upon one axle than another, or more than has been contemplated by the manufacturer;" and another object of the invention is to "construct the under part of the carriage or engine in such a manner that a long bearing upon the rails, or distance between the front and back wheels, is obtained without the engine being rendered too stiff for passing round curves or over crossings," these arrangements resulting in the construction of a "safe and steady working engine."

The invention consists "in the adaptation of a moveable truck or frame under the front of the locomotive, or under the end of a waggon or carriage, and which moveable truck or frame radiates from a centre between the driving or coupled wheels and the wheels of the truck frame;" likewise in a mode of connecting the front part of the engine or boiler with the truck frame.

In one arrangement a guide pole is attached to the fore part of the engine, there being at the end of this guide pole a ball and socket joint, "which admits of a curved or circular movement of the frame on the centre," so that it may "adjust itself to the inequalities or curves of the rails;" certain pendent arms and a second ball and socket joint and certain plates completing this part of the invention.

"Instead of causing the weight to bear upon each of the wheels separately the weight is sustained by horizontal beams, which support the springs and extend longitudinally from axle to axle, the ends of the beams being above the axle, so that upon placing the weight of the engine or carriage upon the centre of the beam it is transferred to two axles instead of only one."

In applying the invention to carriages similar arrangements are employed, the patentee stating that fewer buffers and draw bars will be required than are usually necessary, other advantages being also mentioned as arising from the invention.

[Printed, 1s. Drawing.]

A.D. 1857, January 19.—N<sup>o</sup> 156.

SMITH, THOMAS BRIGGS.—(*Provisional protection not allowed.*)  
—"An improvement in constructing boxes for journals and other bearings."

This invention consists in the employment of boxes or bearings for journals of "a composition, the principal ingredient and base of which is sulphur."

The inventor states that the materials which he has found most suitable for the purpose are plumbago, steatite or soap stone, cinnabar or sulphuret of mercury, coal tar, mercury, and naphtha, in varying proportions, mixed together in a liquid state, but he states that he does not confine himself to these, nor to the use of all of them. In a plastic state the composition may be moulded into any form required, but when used as a box or bearing for

journals "it is run into a skeleton box of a cellular form," a skeleton box so filled being "particularly applicable for railway carriages."

The composition is set forth as enabling journals to run with less friction than ordinary, and rendering them "under certain conditions" self-lubricating.

[Printed, 4d. No Drawings.]

A.D. 1857, January 21.—N° 176.

LEDURE, ELOI JEAN BAPTISTE.—(*Provisional protection only.*)  
—"An improved railway break."

This invention relates "to the application of the rotating power of each wheel of a railway carriage as its own break, by means of excentrics fixed on the axle, the action being so regulated that the pressure of the break or rubbing surface may either be applied suddenly for immediate stoppage, or progressively for ordinary stopping." In order to accomplish this, the inventor fixes "two excentrics near either end of the axle inside the frame, each being furnished with an excentric rod extending horizontally in opposite directions. The excentrics being fixed to the axle are always in motion during the rotation of the wheels. Break surfaces are suitably supported from the carriage frame at opposite diameters of the wheel, upon which the excentric rods are caused to act when required. The excentric rods are held up at the free end by a link connected with a bell-crank lever pivoted on the carriage frame, which is linked or otherwise connected with a hand lever situate in any convenient part of the carriage, which may be in connection with the whole of the excentric rods."

The details of the invention are set forth at some length.

[Printed, 4d. No Drawings.]

A.D. 1857, January 24.—N° 216. (\* \*)

HARRIS, JAMES.—"An improved method of stopping or retarding railway carriages and trains, locomotive and stationary engines and machinery, together with certain apparatus which may be employed therein."

The improvement consists in working the breaks on a railway by compressed air instead of by screws or springs. An air pump or pumps are fixed to the framework of the carriage or tender, and



are worked by a crank or eccentric from the ordinary axle, or by a separate axle with appliances for throwing the same instantaneously in and out of gear. The cylinders connected with the breaks are placed on the sides, tops, or beneath the seats of the carriages. The air employed has a pressure of about 18 pounds on the inch, and is compressed to about the half of its bulk. The pipes through which this compressed air is impelled from the air pump to the cylinders are carried under the bottoms or along the roofs of the carriages. The fixed parts of the pipes are of metal with "unions" at their ends and self-acting air-tight valves opening inwards; the other parts of the pipes for making connections are flexible, with metal ends forming parts of the unions. Another plan is to have a valve opening inwards at each end of the flexible pipes as well as in the fixed pipes, each valve opening the other at the same joining, so as to make a perfect passage at the time of attaching the pipes. These joints separate if the couplings of the carriages give way and leave a closed valve at each end of the separated pipes.

Describes a similar apparatus to be worked by hand for retarding stationary engines or machinery at a distance, and a method of "signaling" by small cylinders and pistons simultaneously to every floor of a mill or factory, that the engine is about to be started.

There are safety valves to prevent the bursting of the machinery. The opening of the safety valve liberates all the breaks.

[Printed, 4d. No Drawings.]

A.D. 1857, January 26.—N<sup>o</sup> 229.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Schuler Laurent.*)—"A method of lubricating and preventing the heating of axles, journals, and bearings in railway engines and carriages."

This invention consists "in applying, either continuously or at intervals, a stream of cold water to the journals, axles, and bearings in locomotive engines and carriages, through a pipe leading from the feed pump of the engine, tender, or other supply, whereby the journals and bearings are partially lubricated and prevented from becoming overheated. The tube should be provided with a tap, having a handle within reach of the engine driver or guard, so that by turning the tap he may

“ project a stream of water on the journal or journals, a portion  
“ of which water remaining in the axle box, and being replaced  
“ by a fresh supply, surrounds the journal, lubricates it, and keeps  
“ it cool.”

The invention is described more particularly with reference to lubricating the axle of a railway engine.

[Printed, 8d. Drawing.]

A.D. 1857, February 6.—N<sup>o</sup> 338.

MYERS, HENRY, ASKEW, CHARLES, and ASKEW, JOHN.—  
“ Improvements in railway and other breaks, and communicator  
“ between the guard and driver of railway carriages.”

This invention relates to a mode of arranging horizontal tubes and rods in connection with bands in such a manner that if required the train or vehicle to which such tubes and rods are attached “ can be gradually, rigidly, and instantaneously stopped,” certain signalling apparatus being also used in combination with this mechanism. One end of the tubular phonic communicating tube carries a “ tubular spring cylinder with four tappets, a “ beveled cog wheel, and revolving tubular air-tight head. “ The mouth of the intermediate cylinders is champered a little “ inwards from the outer edge to the spring pressure plate, and “ the opposite end of the shaft carries a tubular fluted piston, “ with half rounds or sharp rounds on its sides, which are made “ so as to readily slide in and out of the cylinders and clutching “ the same, and so throughout a railway train.”

The details of this invention are variously set forth, and include a number of particulars which do not belong to the subject of the present series of abridgments.

[Printed, 8d. Drawing.]

A.D. 1857, February 7.—N<sup>o</sup> 353.

JOHNSON, JOHN HENRY.—(*A communication from Jackson Brothers, Petin, Gaudet, and Company.*) — “ Improvements in “ casting metals.”

This invention relates to the employment of centrifugal force in casting steel articles, such as railway wheels, tubes, and hollow axles, and consists in causing the chills to rotate at a high velocity during the time the molten metal is running in, the patentee stating that articles thus made are much stronger in proportion

to their weight than articles composed of the ordinary materials cast in the usual way.

In casting railway or other solid wheels the chill is secured by bolts to the end of a shaft which is made to revolve at the rate of from about five hundred to upwards of a thousand revolutions per minute. "The molten steel is run into a central opening in the cover of the chill, and is instantly directed by the centrifugal force against the inner circumference of the chill, thus rendering that part of the wheel perfectly sound and homogeneous, and thus it is entirely free from flaws. When the chill is full a mandril is caused to enter the central opening, and as the chill still continues to revolve it has the effect of smoothing or polishing the central opening in the wheel. The mandril is then withdrawn and the revolutions of the chill having been stopped the cover is removed" and the complete article taken out. "This wheel may or may not, as found desirable, be subjected to the blows of a steam hammer between suitably shaped dies."

The casting of steel tubes suitable for marine or locomotive boilers is effected in a similar manner, "the chill consisting of a tube into which the steel is run," such tube being made in two parts for convenience in removing the casting, and the tube thus formed being then drawn out to any required extent in a rolling mill. "If intended for a hollow railway axle it is reduced into shape by a steam hammer or other well-known contrivance."

[Printed, 8d. Drawing.]

A.D. 1857, February 10.—N<sup>o</sup> 385.

CHAMBERS, AUSTIN, and CHAMPION, WILLIAM HARRISON.—"A mode of working railway breaks."

According to one modification of this invention each carriage of a railway train is provided with a longitudinal shaft, mounted in suitable bearings below the framing, there being on this shaft a worm wheel in gear with which is a worm fixed on a vertical shaft which may be turned by hand. Upon this shaft is also a pulley, having connected to it a cord or chain, which passes over another pulley mounted in the framing, and is then connected to one end of a "double lever," the fulcrum of which is at the other end, and which lever carries a spindle on which is mounted a small drum. Over this drum an endless belt is passed, which belt also passes underneath one of the axles of the

carriage, but hangs below and out of contact with it when it is not desired that the breaks shall act. To the spindle which carries the drum is connected one end of a chain, the other end of the latter being attached to a rod which is jointed to the break lever, the break apparatus being of the ordinary character. On the guard turning the vertical shaft of any of the carriages in one direction, so as to turn the longitudinal shaft and cause the pulley thereon to wind a portion of the cord or chain attached thereto upon itself the double lever is raised, raising with it the drum already mentioned and causing the endless belt to be pressed against the axle of the carriage, the rotation of which now causes the drum to revolve along with the spindle on which it is mounted, the chain attached to the latter being thus coiled to some extent upon it, and causing the rod connected thereto to move the break lever and so apply the breaks. On the guard turning the vertical shaft in the opposite direction the double lever is lowered, the endless belt passing over the drum is again lowered out of contact with the axle, and a helical spring upon the rod connected to the break lever restores that rod and the lever and the parts in combination therewith to their first positions, releasing the breaks from the wheels. The longitudinal shaft of one carriage is made to move in unison with another by means of a cord passed round certain pulleys or wharves fixed on the shafts, and over and under certain carrier pulleys connected with an arrangement of radial links in such manner as always to keep the cord in a state of tension, although the distance between the carriages may vary. In order to prevent the breaks from acting too suddenly an elastic medium may be interposed between the cord or chain which works the double lever and the end of the lever to which it is attached, or between the fulcrum of the lever and its support.

In another modification of the invention the longitudinal shafts are dispensed with, and the double levers are actuated by means of a cord or chain attached to the boss of a hand wheel, and extending from one carriage to another throughout the train, "radial levers" between the carriages being provided with carrier pulleys for the reception of the chain or cord, and serving to keep the latter at a proper tension, these levers being hooked at the ends, or having slots and pins, by which means they can be readily connected with and disconnected from each other.

[Printed, 1s. 4d. Drawings.]

A.D. 1857, February 13.—N° 432.

**HARDSTAFF, GEORGE.** — "Improvements in apparatus for "actuating and applying the breaks of carriages used on rail-ways, and for coupling such carriages."

According to this invention the coupling apparatus of railway carriages is so arranged that the carriages of a train are at all times kept at an equal distance apart from each other, while the break apparatus is so contrived that all the breaks of a train may be put into action simultaneously by the piston rod or rods of a steam cylinder or cylinders applied for the purpose to the locomotive engine. Each coupling consists of two main parts, one of which is fitted to one end of a carriage and the other to the other end of such carriage, the first consisting of a female screw or socket moving at one of its ends on a vertical axis, while the second consists of a male screw, part of the stem of which is fixed in, but is capable of turning in a socket, the latter being capable of moving on a horizontal axis, and the male screw of one carriage being inserted into the female screw or socket of the next, there being on the stem of the male screw a weighted projection or arm, which, hanging downwards, prevents the coupling "coming unscrewed." These couplings may be used in conjunction with the ordinary coupling chains and buffers.

As regards the breaks, it is preferred that each of the wheels of each carriage should be provided with a break, to act upon its upper surface, each break being mounted at one end upon an axis connected to the framing of the carriage, and also connected at the other end to an arm fixed upon another axis passing across the carriage, other arms connected to these axes having slots in them into which are inserted pins or studs carried by a horizontal bar, and the bar of one carriage being connected to that of another by mechanism which forms a kind of universal joint. These bars are worked by a piston placed in a steam cylinder connected with the locomotive, the arrangement being such that on steam being admitted to one side of the piston the bars are so moved as to apply the breaks to the wheels, while on the steam being admitted to the other side they are withdrawn therefrom. Instead of one cylinder and piston, two may be used, the rods of the two, in the latter case, being united by a cross head. The form of the breaks themselves may be varied.

[Printed, 10d. Drawing.

A.D. 1857, February 16.—N° 447.

JACKSON, WILLIAM ROBINSON. — "An improved railway break."

According to this invention a railway break is so arranged that when the car or carriage to which it is applied is either being drawn forward or backed the break shall be thrown out of action; and the wheels left free to revolve, but that when the tractive or backing force ceases to be applied the break will come into operation and check the speed of such car or carriage.

Break blocks are arranged in the usual manner between the wheels of a carriage, a spiral or other spring being so combined with a sliding disc upon a vertical rod and certain cams upon a cam rod, that when the spring is at liberty it forces the blocks against the wheels. Upon tractive force being, however, applied to the carriage, which is effected through the medium of a rod jointed to certain arms which are capable of assuming different angular positions, the latter are made to move the sliding disc and the cam rod and cams in such manner that the break blocks are released from contact with the wheels, the arms, in fact, forming a kind of toggle joint, and being so combined with the disc that whether the traction rod is drawn forwards or forced backwards they move the disc in such manner as to prevent any action of the spring upon the breaks. A "lock lever" is employed to keep the breaks out of action while the carriage is being moved about by hand.

[Printed, 6d. Drawing.]

A.D. 1857, February 19.—N° 483.

MEAKIN, GEORGE FREDERICK LEE.—"An improved method of applying breaks to railway carriages."

In this invention ropes or chains along with rods or bars are employed in connection with the different carriages of a railway train for the purpose of working the breaks of such train. "These appliances are for the purpose of enabling the men having charge of the train, by working certain apparatus consisting of a screw wheel and drum to which the rope or chain is attached, acted on by a spring for the purpose of rapidly taking up any slack in the rope or chain, and allowing the men to apply the requisite force to the breaks, or by means of apparatus consisting of cylinder and piston with rod attached, and to which the



" rope or chain is fixed, so that when water or steam is forced into the cylinder behind the piston, it immediately moves the piston and rod, and draws the rope or chain and applies the necessary force to the breaks; or by means of a crab, screw wheel, and drum, lever, or other equivalent mechanical contrivance for tightening up the said rope or chain, to move simultaneously the breaks on to the wheels of any number of carriages with a force sufficient to retard or stop them."

This invention is described at some length, the invention including "apparatus for preventing the relative change of position of carriages in a train affecting the tension in a rope or chain used for the purpose of applying breaks to trains," such apparatus being also applicable for "the better working of ropes or chains used for working signals between guards and engine drivers," and also "apparatus for holding fast a rope or chain in the event of its breaking or becoming disconnected, so as to enable tension to be applied to it for the purpose of working breaks on trains."

[Printed, 10d. Drawing.]

A.D. 1857, February 26.—N<sup>o</sup> 564. (\* \*)

HOY, JOSEPH, senior.—(*Provisional protection only*).—"Improvements in apparatus for distributing sand on railway rails."

"In arrangements of levers and valves connected with suitable sand boxes attached to the locomotives or other vehicles of railway trains, for distributing sand with greater precision than can be at present attained."

"The sand box acts as a hopper to contain the sand, and is supplied at bottom with a pipe, above which, under the box, is a horizontal slide worked by a wire or rod connected with levers."

"The slide or valve covers oblong, round, or other shaped apertures, and is made self-acting by a spring regulated by a notched handle, or similar means, for graduating the delivery of the sand for distribution through the pipe on to the rail."

[Printed, 4d. No Drawings.]

A.D. 1857, February 27.—N<sup>o</sup> 581.

DRAPER, SAMUEL.—"Improvements in apparatus for retarding and stopping carriages on railways, and in cocks or taps for such and other purposes."

In this invention each carriage of a railway train is provided with a hydraulic cylinder and ram, communicating with a vessel containing water, a pump in connection with the hydraulic cylinder being put in motion when it is desired to apply the breaks by means of excentric or cam surfaces placed on one of the axles of the carriage, the ram then acting upon a lever, which in its turn acts through the medium of connecting rods upon the several breaks of the carriage, which are by preference so arranged that a break operates on each side of each wheel.

In order to control the working of the apparatus, a tube is provided which is constantly filled with water, and has therein a cock, by turning which the guard of the train may cause water to flow from beneath a small plunger placed in a suitable cylinder; this plunger, when the breaks are not required to operate, being in a raised position, and causing a certain lever to act upon the lever mentioned above so as to keep the latter out of action.

And in order to render break apparatus or other mechanism, if requisite, self-acting, "a flexible tube is laid on the line of railway, and is pressed on by a wheel carried by each train, by which fluid contained in the tube is prevented passing onwards beyond the nip of the wheel of the forward train. Each train also carries another wheel on a lever, or apparatus arranged in such manner as to put the break apparatus into action when the wheel is caused to rise by the tube being expanded by fluid," the arrangement being such that by the pressure of the wheel of one train, fluid is caused to flow forward through the tube, "but should there be a previous train so little in advance that its wheel is pressing on the tube, the fluid will be prevented passing forward and the tube will be swelled or expanded, and will act on the wheel in connection with the break apparatus, and the breaks of the train will be put into action; and, if desired, the whistle or a bell may also be thereby sounded."

The invention includes so contriving a cock or tap that the plug thereof "is arranged to rise or move a distance in addition to its rotation," the plug, moreover, being furnished with a valve which allows the passage of water freely in one direction, but stops it in the other, the result of this contrivance being that "when the plug has been opened it can only be closed slowly," the speed at which it is allowed to be closed being regulated "by

" the fluid beyond the plug being allowed to pass through a  
" comparatively small hole or passage."

[Printed, 10d. Drawing.]

A.D. 1857, February 27.—No 582.

NEWTON, ALFRED VINCENT.—(*A communication.*)—" An im-  
" provement in springs for railroad carriages and other uses."

This invention relates "to what are known as volute steel  
" springs," and is intended to prevent such springs from being  
" injured and broken " by the effects of the vibrations and sudden  
" or sharp concussions to which the springs of railroad carriages  
" are constantly exposed, particularly when trains are driven at  
" very high speeds."

The patentee states that the inventor has discovered by experi-  
ment that " any spring which is firmly held by one end in a vice  
" will be readily broken when struck with light but sharp and  
" quick blows, but that if the other end be held in the hand it  
" will successfully resist such concussions," this result probably  
being due to the fact " that by holding one end of the spring in  
" one hand the vibrations to which it would be otherwise sub-  
" jected are prevented by contact of the elastic substance of the  
" hand, in the same way that the vibrations of a bell are prevented  
" by the pressure of the hand or any elastic substance against the  
" rim. Induced by these considerations, after observing the fact  
" that volute steel springs, when applied to carriages, so readily  
" break under the action of forces far below the forces to which  
" they were subjected in the proof, the inventor was led to the  
" conclusion that the texture of the metal was rapidly destroyed,  
" not by the weight of the load which the springs contained, but  
" by the sharp and hammer-like concussions to which they were  
" subjected, and that the effect was analogous to that of breaking  
" a spring by the slight blows of a hammer when held firmly at  
" one end in a vice."

The present invention, therefore, consists " in combining with  
" one end of a steel volute spring an elastic cushion, placed and  
" held in contact with the inner end of such spring, so that  
" during the play of the spring such elastic cushion shall at all  
" times be in contact with the end only of such spring, and by  
" such contact prevent the vibrations which would be otherwise  
" induced in the metal of such spring." By the word " vibra-

"tions" is meant, not "the elastic play of the spring, but the vibrations among the particles of matter, such as take place in a bell when struck."

The mode of carrying out the invention may be varied, but an arrangement is described in which a volute spring is fitted into the interior of a cylindrical case or "housing," which is to be attached to any "required part" of a carriage, there being above this cylindrical case a part which forms an inverted frustrum of a hollow cone, the lower edge of which constitutes a shoulder which sustains the outer coil or coils of the spring. Into the central space of this spring is inserted a core of wood or other substance, and to the upper end of this is secured a disc of leather or other material, which extends over the inner coils, a piece of india-rubber or other elastic substance being placed between the disc and the upper part of the case, and a metal plug, which also projects into the central space of the spring, being provided with a shoulder on which rests the lower edge of the inner coils.

[Printed, &c. Drawing.]

A.D. 1857, February 28.—N° 591.

**McCONNELL, JAMES EDWARD.**—"Improvements in railway breaks."

According to this invention railway breaks are worked by the application of steam power, the retarding action being obtained both "upon the periphery of the wheel and upon the surface of the rail."

The improvements consist in attaching a cylinder or cylinders to the locomotive engine or tender, and to any one or more of the carriages in the train, "such cylinder or cylinders being fitted with covers and stuffing boxes at each end, and having a single or double piston working therein, the piston rod passing through one or both ends of the cylinder, and being jointed to a pair of knee or toggle joints."

"The lower ends of these joints are connected with the stud or break, which has a long bearing surface to slide upon the rail when in action, whilst at the same time one of its extremities is curved to fit the periphery of the wheel to be broken."

The cylinders mentioned above are connected by suitable pipes or flexible tubes, and when steam or fluid "is admitted on to one side of the pistons it causes the toggle joints to straighten &c

"partially straighten, and this has the effect of pressing down the skids on to the rails," certain radius rods serving to "preserve their proper distance from the peripheries of the wheels."

"By admitting steam on to the opposite side of the pistons the contrary effect will be produced, and the breaks will be taken off. Suitable valves are of course employed for regulating the admission of steam or fluid to either side of the pistons as required."

The details of the invention may be varied. For instance, either one or more than one cylinder may be applied to each skid or break, and other modifications of the parts made according to circumstances.

[Printed, 1s. 6d. Drawings.]

A.D. 1857, March 2.—N° 601.

PARKER, THOMAS.—(*Provisional protection only.*)—"Improvements in railway wheels."

This invention consists in "making the tire and rim of the wheel in one entire piece," the spokes being afterwards "welded into the inside thereof," there being thus "no necessity for revits or screw bolts, as under the present system. The spokes are flat spokes, made altogether under the hammer."

[Printed, 4d. No Drawings.]

A.D. 1857, March 3.—N° 625.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—(*Provisional protection only.*)—"Improved machinery for removing snow from railways."

This invention consists in improvements upon the snow plough for which a Patent was granted to the present patentee on the 13th of May, 1856, and has for its object the adjustment of the central vertical planes used in that invention, "so that the snow on the track, after being raised up to the level of the surrounding snow, can all be pressed or thrown over laterally on to either side as may be desired." To this end "it is proposed to construct upon the main inclined plane of the snow plough a central groove extending very nearly from top to bottom of the plane, and also two transverse grooves at right angles to each other, and extending very nearly across the main plane."

The vertical planes are constructed in a single block or piece of a triangular prismatical form, having on its under side two

"projections or lugs to fit into the grooves in the main inclined plane, and having also attached to its upper part a rack or chain attached by means of a universal joint. The block is so placed as to slide up and down on the main plane, the projections underneath being in the grooves of the main plane," a certain "revolving guide piece" being used to cause the block to throw the snow either to one side or the other, as may be required, such guide piece being actuated "by means of a framework or levers below the inclined plane."

[Printed, 4d. No Drawings.]

A.D. 1857, March 5.—N° 650.

THOMPSON, THOMAS JEFFERSON.—"Improvements in the construction of gasometers, whereby they are rendered applicable to lighting railway carriages."

According to this invention, the ordinary mass of water generally used in a gasometer is dispensed with, and "no more water is required than is sufficient to form an hydraulic packing of about one inch in breadth." A rectangular tank is in the first place formed, sufficient for the supply of water to a locomotive engine. This tank "has no lid or opening, excepting a funnel which enters the bottom of tank from back part of gasometer for the purpose of filling said tank with water." Round the sides of this tank is a thin iron sheeting, which stands higher than the sides of the tank itself, and is at a distance of about one inch therefrom, a space being thus obtained, which is filled with water "until the water is about one inch in depth over top of tank," the moveable part of the gasometer working up and down within this space. The result of these arrangements is, that as the gasometer descends, the water displaced thereby will occupy the space between that and the roof of the tank, so that when the gasometer is again filled with gas, the water will flow off the roof of the tank to supply the deficiency caused by the rising of the gasometer.

In adapting the invention to the lighting of railway carriages, an arrangement of vulcanized india-rubber tubes is employed to convey gas from the gasometer to each carriage, certain union joints, "cut off pipes," and other apparatus being used according to circumstances. The balance weights usually applied to gasometer are in this invention dispensed with.

[Printed, 1s. 2d. Drawings.]



A.D. 1857, March 12.—N° 712.

WARESQUIEL, ALBERT, Viscount de, and D'HELLE, JULIEN. — (*Provisional protection only.*)—"Improvements in railway carriages."

These improvements relate, firstly, to a new arrangement of railway carriages, trucks, and waggons, "permitting their loading and unloading without the aid of turntables, and doing away consequently with a great part of these latter on a line, besides rendering the carriages, trucks, or wagons more suitable for laying down the roads. This part of the invention consists in making the body of the carriage independent of the truck, by establishing between the upper part of this latter and the under side of the body a sort of small turntable, in such manner that the body of the carriage may move in a horizontal direction over an annular plate, and round a spindle fixed to the upper part of the truck, a suitable number of friction wheels serving for guiding the rotative motion of the carriage, and bearing the weight of the same." Carriages or wagons intended for the transport of luggage or earth, "or other loads, may have part of their sides made to turn on hinges, in such manner that one or more of these sides being lowered," may serve as an incline or inclines to facilitate the loading and unloading of the vehicle.

Another part of the invention consists in furnishing such wheels with a separate short axle, "instead of having one axle for each pair of wheels," the inventors stating that this arrangement allows of each wheel having its proper motion," and that it is particularly intended for carriages on that sort of railway called tramways."

[Printed, 4d. No Drawings.]

A.D. 1857, March 14.—N° 729.

BRIDGES, HENRY.—"Improvements in buffing, bearing, and draw springs, and buffer cases, for railway purposes."

These improvements consist "in placing or inserting in a frame or case layers or laminations of vulcanized india-rubber or other suitable elastic substance of convenient thickness and form, and separated or alternated by dividing plates or blocks of metal or wood having recesses on one or both sides thereof to receive the india-rubber or other elastic substance contiguous

" thereto, and such recesses having one or more projecting pin  
" or pins to pass through or partly through a hole or holes in the  
" layers or laminations of such india-rubber or other elastic sub-  
" stance, to preserve them in their required position in the frame  
" or case." At one end of the latter is a socket piece or piston,  
capable of sliding backwards and forwards therein, and having a  
rod or plunger connected thereto, the spring formed by the india-  
rubber or other elastic substance being compressed by means of  
wedges to the extent required.

Arrangements of this character are described as applied to  
buffer, bearing, and draw springs respectively. In the first  
the buffer head is attached to the rod or plunger mentioned  
above, and the buffer case is composed of two or more sections or  
parts, bolted or otherwise connected together, there being in one  
or more of such sections or parts a recess or channel "formed to  
" receive one or more projections or stops on the buffer rod or  
" plunger, so as to prevent it falling or being forced out on a re-  
" bound of the spring or other causes; or the recess, groove, or  
" channel may be in the buffer rod or plunger, and the projection  
" or stop, or projections or stops, on one or more of such sections  
" or parts of the buffer case." The arrangement of the buffer  
case in separate parts, bolted together, enables one or more of  
such parts to be removed, and the piston or plunger and spring  
to be removed "without taking down the whole case." Several  
modifications of these buffers are described, in some cases the  
dividing blocks being without recesses, and both blocks and  
springs working on guide rods when requisite. Springs of steel  
may be used if desired.

In draw springs the blocks and elastic layers are mounted  
upon or within frames or cases capable of moving one upon  
another, each frame or case having a draw bar connected thereto,  
several modifications of this part of the invention also being de-  
scribed.

For a bearing spring, a piston block is attached to the axle box  
of a carriage, and the elastic layers and dividing blocks are  
placed between this and a plunger connected to the under frame  
of such carriage.

[Printed, 10d. Drawing.]

A.D. 1857, March 20.—N<sup>o</sup> 787.

SAYER, GEORGE WILLIAM.—"Improved machinery for stop-  
ping or retarding railway carriages."

This invention consists of improvements upon the invention for which a Patent was granted to the present patentee on the 20th of September, 1856; and consists, firstly, "in an improved mode of adjusting the break blocks, so that when a number of carriages are connected together in the form of a train, all the break blocks may be in proper adjustment, such adjustment having been previously effected with facility, and in much less time than heretofore."

This adjustment is effected by making the arms which carry the break blocks, described in the Specification of the former Patent, "adjustable on the central longitudinal break shaft, instead of such blocks being separately adjusted," as therein set forth. The patentee also proposes, in some cases, to provide the central longitudinal shaft with right or left handed screws only, which will act either way; and instead of connecting together the break rods of contiguous carriages by a single square socket, to effect the connection by means of forked sockets and universal joints, certain adjusting points or studs also aiding in this part of the invention.

With regard to this part of the apparatus, the patentee also proposes to impart a certain degree of elasticity "to the break arms or break blocks, or to both in combination," this being effected by making the transverse break arms of steel, so as to render them somewhat elastic; and he also proposes to adapt to the back of the break blocks, cushions or springs of india-rubber, or some elastic material "which will yield slightly when undue pressure is imparted thereto." By this means the central longitudinal shaft may continue to rotate, even after the break blocks are brought into action and pressed against the peripheries of the running wheels, an alarm bell being so contrived in conjunction with the rest of the apparatus as to make "an audible signal when the blocks are screwed up."

The details of the invention are set forth at considerable length, and include a peculiar mode of connecting the longitudinal break shafts; clutches, "alternative gearing," band wheels, and other apparatus being employed in various forms in carrying out such details.

[Printed, 1s. 2d. Drawings.]

A.D. 1857, March 26.—N° 854.

RUALEM, FRANÇOIS.—(*A communication.*)—(*Provisional protection only.*)—"Improvements in railway brakes."

This invention relates to the application of brakes of the kind known as skids or shoes, which are introduced between the wheels and the rails, "and consists more particularly of a peculiar arrangement of mechanism for bringing the brakes into action."

According to this arrangement "each or any number of carriages in a train is fitted with two sets of skid brakes, one set being at each end of the carriage, so as to enable it to run in either direction without the necessity for turning it. Each brake consists of a curved or semicircular metal strap, which is hinged above the centre of the wheel to the carriage framing, the lower or free end of the strap being fitted with a shoe or skid, which upon being released enters below the wheel, and consequently stops its rotation." The brakes of each pair of wheels are united by a transverse rod or bar, "which rests upon or is supported by a spring catch when out of action, but when the brakes are to be applied, the spring catch is withdrawn by the aid of suitable chains and segments, and the metal straps are then lowered so as to meet the shoes under the wheels, and at the same time press upon or embrace their peripheries. The actuating chain is wound upon a drum actuated by a winch handle and bevil wheels in the ordinary manner of working a brake."

[Printed, 4d. No Drawings.]

A.D. 1857, March 31.—N<sup>o</sup> 885.

EVANS, JOHN CAMPBELL.—(*Provisional protection only.*)—"Improvements in railway rolling stock."

This invention relates to "an improved arrangement of apparatus for actuating railway breaks, and to a peculiar construction and arrangement of coupling for the rolling stock of railways."

As regards the arrangement for actuating the breaks, the invention consists in the employment of "a spirally grooved cone, or a screw of gradually increasing diameter," fitted upon one of the axles of a carriage, and rotating therewith, and so arranged in connection with a brake lever that it may operate upon the latter when requisite. Thus when it is necessary to apply the brakes, the lever "is brought in contact with the smaller part of the cone or screw, and as the latter revolves with the axle, the lever gradually traverses to the larger part of the cone or screw, and by its motion puts on" such brakes. The lever

may be kept apart from the cone or screw until the brakes are to be applied, by any convenient means, and instead of the invention being applied in connection with one of the axles of the carriage only, it may be adapted to more than one.

As regards the arrangements for coupling railway rolling stock, the invention consists in the employment of a ball and socket joint, or modifications thereof, in combination with india-rubber or other suitable elastic material, the object of this arrangement being to prevent or deaden the shocks or jars which are so injurious to mechanism of this character.

[Printed, 4d. No Drawings.]

A.D. 1857, April 4.—N° 936.

TOUSSAINT, JOSEPH FERDINAND. — (*Provisional protection only.*)—"A method for facilitating the examination and discovery  
" of fissures, flaws, or deteriorations in the inserted or hidden  
" parts of axles or other like pieces of machinery subject to decay  
" and rupture."

In one part of this invention, "that part of the axle or other  
" piece of machinery where experience has shown that breakage is  
" most to be apprehended," is rendered visible by the use of notches "made on the circumference of the inserted piece." In another case, openings, "extending lengthways along the entire  
" inserted part," are formed at any convenient distance asunder.

"If the axle or piece of machinery has a shoulder or swelling  
" just before the point of insertion, this must be removed wholly  
" or partially, to correspond with the above-mentioned notches  
" or openings."

[Printed, 3d. Drawing.]

A.D. 1857, April 7.—N° 977.

FINCH, EDWARD.—"An improvement in railway breaks."

The patentee mentions, in the first place, that in the construction of breaks worked by a lever, great inconvenience has been experienced from the constant wear of the wooden break blocks altering the position of the break lever; and he then states that the present invention consists in a means of altering the position of the break lever in respect to the axis by which the breaks are actuated, so as to compensate for the wear of the blocks, and by *this means* always to maintain the lever in the same position in

relation to the carriage or wagon. "For this purpose the end of  
"the break lever is arranged so as to move on the axis by which  
"the breaks are actuated, and the break lever has attached to it  
"a worm, which takes into a worm wheel on the axis, so that as  
"the blocks are worn away, by turning the worm attached to the  
"break lever, the position of the lever can be adjusted so as  
"always to retain the same position in relation to the carriage or  
"wagon."

The invention is described in detail, the main feature, thereof, however, being set forth as consisting in the combination of a lever, worm, and worm wheel or rack, and break blocks.

[Printed, 6d. Drawing.]

A.D. 1857, April 13.—N<sup>o</sup> 1043.

BEAUMESNIL, PIERRE VICTOR, and ERHARD, CHARLES.—  
(*Provisional protection only.*)—"A new and improved system of  
"wheels for railway and other carriages."

In this invention, "in place of making the spokes of wheels in  
"one piece from the nave to the felloe, as heretofore, each of the  
"spokes is made in two parts, one part being fixed to the felloe,  
"and the other to the nave, and the two parts being connected  
"together by a pin on one of the parts passing through a slot  
"formed in the other part. By this means it will be seen that  
"the axle will always be below the centre of the wheel. The  
"parts of the spokes fixed to the felloe are made in two sets,  
"between which the parts of the spokes fixed to the nave pass;  
"and their ends are held securely by being fastened to rings, the  
"inside of the rings being sufficiently large to admit of the  
"movement of the nave; and the two sets of the parts of spokes  
"fixed to the felloe are held together by means of the pins which  
"pass through the slots in the other parts of the spokes," the  
inventors stating, however, that in place of having spokes fixed  
to the felloe, "two discs may be employed, the spokes fixed to  
"the nave working between them, the two discs being held  
"together by means of the pins which pass through the slots in  
"the other spokes, and a hole being left in the centre of the discs  
"for the movement of the nave."

[Printed, 4d. No Drawings.]



A.D. 1857, April 16.—N° 1073.

RAGGETT, GEORGE.—(*A communication.*)—(*Provisional protection only.*)—"Improvements in railway breaks and carriages."

According to this invention break rubbers or blocks are mounted directly over the wheels of a railway carriage, each brake being connected to the centre of a curved spring which extends over it, and for some distance beyond it on each side, the ends of this spring either being slotted to receive bolts which are secured to the carriage frame, or a "lip" being turned at each end of the spring, and connected with a strap or staple in the frame, the spring when at liberty keeping the brake raised, so as to be free from the wheel, but allowing it to be depressed when necessary into contact therewith. Each spring carries on its central part a bearing suitable for a "rock shaft," each shaft passing across the frame of the carriage, and having upon it collars which are provided with hooks, a chain passing from each hook to the axle box, or some other convenient part of the vehicle to which it is attached. The result of this arrangement is, that on the rock shaft being turned in one direction the chains are coiled upon it, and the springs with the brake blocks are forced downwards, bringing the latter into contact with the wheels, while on the shaft being turned in the other direction, the chains are unwound therefrom, and the springs again raise the brakes out of action. The movement of the rock shaft is produced by means of levers fixed or formed thereon, and connected together by horizontal rods, the whole being operated through the medium of a chain and a vertical shaft turned by hand.

[Printed, 10d. Drawings.]

A.D. 1857, April 16.—N° 1086.

FONTAINEMOREAU, PETER ARMAND LE COMTE DE.—(*A communication.*)—"An improved truck apparatus for moving and "transporting stones and other heavy bodies."

This truck is composed essentially of two iron or wooden rollers, each "of the shape of a double truncated cone," each roller being furnished at each end with a cap and axle of metal, the axles turning in bearings composed of any suitable material, and the two rollers being connected laterally by rack bars, by

which the distance between the rollers may be increased or diminished at pleasure. In order to draw the truck along, hooks of an S form, to which ropes may be fixed, are passed through holes in the bearings or supports of the vehicle.

"Another mode of constructing the truck consists in forming the truck with iron bearings or supports," as already mentioned, such axle being "fitted with two flanged wheels which run upon a tramway. The supports or bearings are fixed to a table or platform by bolts and nuts."

[Printed, 8d. Drawing.]

A.D. 1857, April 30.—N° 1220.

CAMMELL, CHARLES.—"Improvements in the manufacture of axles or axletrees for railway carriages, and shafts for various purposes."

This invention relates to the manufacture of railway axles and other articles, of "a combination of hard metal, such as steel, with a softer, tougher, and more malleable metal, such as wrought iron," axles and other articles being thus produced which are of superior quality to those usually manufactured. The patentee proposes to carry out the invention by enclosing a core of malleable or wrought iron of good quality within a covering of steel of any desired and suitable thickness, according to the dimensions of the article intended to be produced, and the purpose to which it is intended to be applied.

The details of the invention may be varied. One modification which is described consists in combining cast steel or other metal with a number of wrought iron tubes, "arranged concentrically one within the other in a suitable mould, leaving annular spaces between the tubes, which spaces will be filled with the cast metal, an outer covering of steel being made to surround and enclose the outermost tube."

Another modification of the invention consists in rolling up a strip of wrought or malleable iron of suitable width, length, and thickness, according to the article to be produced, and producing thereby a convolute tube, which is then placed in a mould, and molten steel poured into it until the mould is filled, and all the interstices between the folds of the tube likewise filled with the molten steel.

Other modifications of the invention are mentioned as consisting in the employment of a wrought iron bar, around which a

mass of steel is cast ; or in casting round a malleable or wrought iron tube or core a mixture of molten, wrought, or scrap iron and blistered steel, rolling and other processes being adopted in finishing articles so produced as may be requisite.

[Printed, &c. Drawing.]

A.D. 1857, May 4.—N° 1260.

PETIET, JULES ALEXANDRE.—“Improvements in actuating  
“ railway breaks.”

This invention consists “in employing a small rotatory engine  
“ worked by steam from the boiler of the locomotive for giving  
“ motion to the break lever.”

“For this purpose it is preferred that the axis of the rotatory  
“ engine should by means of cog wheels give motion to an axis  
“ on which there is a screw thread, the screw thread working in  
“ a nut on which there is a pin, which works in a slot in the  
“ break lever.”

An arrangement is described in which a hollow chamber is attached to a pipe through which an axis passes to which the pipe is attached. Around the circumference of this chamber are certain openings, and the chamber is surrounded by a case attached to the framing of the engine, this case having pipes in which the pipe already mentioned turns, there being in one of these pipes an “enlargement,” through which steam passes from the boiler of the locomotive through another pipe which is furnished with a tap, the result being that the rush of steam through the openings in the first-mentioned chamber, and which are formed tangentially to the circumference thereof, causes it and the pipe and axis connected thereto to rotate, there being on one end of this axis a screw thread carrying a nut furnished with a pin which works in a slot in a break lever, the rotation of the axis causing the nut to traverse on the screw and give motion to the lever, “which may cause blocks of wood to be pressed against the  
“ wheels of a locomotive in the usual manner.” Instead of the screw thread being on a continuation of the axis of the rotatory engine, it may be on a separate axis, and the motion of the rotatory engine may be communicated to this axis by means of cog wheels, this being the arrangement mentioned in the provisional specification. The brakes may be placed out of action by shutting off the steam from the chamber, and reversing the movement of the axis through the medium of a hand lever, or by

means of an engine "arranged to rotate in the opposite direction  
" to the engine which puts on the brake."

[Printed, 8d. Drawing.]

A.D. 1857, May 5.—N° 1273.

BISSELL, LEVI.—"Improvements in trucks for locomotive  
" engines."

This invention relates to guiding the wheels of the "trucks" of locomotive engines when passing along curves in the rails, and preventing them from leaving the rails either in that case or in case of their meeting with an obstruction on the line.

The invention is set forth at some length, but the leading feature thereof consists in attaching trucks having four or more wheels to locomotive engines, in such manner that "the said truck is allowed a lateral motion under the engine, and moves upon a centre located between the drivers and the centre of the truck," the arrangement being such that "the relative positions of the four or more truck wheels with the driving wheels, as determined by the straight or curved track, shall cause the body of the engine to assume the correct position relatively with said track." The forward part of the engine rests upon a centre pin rising from a curved block mounted in a curved slot in the upper part of the frame of the truck, and from this block proceed radius bars which have their common fulcrum on a pin connected to the framework of the engine, the latter forming the "centre of motion," certain inclined planes being so arranged on each side of the centre pin that the tendency of the middle part of the engine on entering a curve to continue in a straight track, and so cause the wheel flanges of the truck to mount the outer rail is counteracted, that part of the engine then slightly rising up one of the inclines instead.

The patentee states that by the use of this invention it becomes unnecessary to place the rails of the outer portion of a curve in the rails higher than the others, and mentions several other advantages as attending the invention.

[Printed, 8d. Drawing.]

A.D. 1857, May 7.—N° 1293.

LLOYD, SAMUEL, junior.—(*Provisional protection not allowed.*)  
—"Improvements in the manufacture of railway wheels, axles,  
" and tyres."

This invention is stated to consist, "first, in manufacturing the axles for passenger carriages and wagons from one ingot or bar of steel; and, second, in converting the outer or wearing portion of wheels and tyres into steel after having been rolled." No particular mode of carrying out the invention is, however, mentioned.

[Printed, 4d. No Drawings.]

A.D. 1857, May 12.—N° 1335.

MALCOLM, JAMES DRYSDALE. — "Improvements in the construction of buffing apparatus for railway engines and carriages."

The object of this invention "is to convert a railway carriage or engine, or a train of such carriages, into an analogous condition to 'non-elastic soft bodies,' as in all cases of collision of such bodies it is an ascertained fact that one half of the power or force of the stroke or momentum is lost or absorbed, whereas in collisions between railway trains or carriages, as at present constructed, the whole of the momentum is exerted to their injury or destruction."

The patentee proposes to effect this by, in the first place, adding a ratchet and catch, or some equivalent mechanical apparatus, "to the buffing apparatus usually attached to railway carriages or to some part of the carriages themselves," in such manner that "while allowing the exercise of a sufficient amount of elastic force for ordinary purposes each ratchet and catch or equivalent apparatus shall act so as to retain the springs and absorb the elasticity of the buffing apparatus whenever and so soon as the carriages shall strike or be driven against any other object with a force likely to be injurious or destructive; and, in the second place, by increasing the strength of the buffer springs and apparatus to an extent sufficient to receive the whole force of the shock to which they may be exposed in the event of a collision, such extra strength of springs, &c. being calculated and ascertained by the weight of the carriages, &c. respectively, the rate at which they are intended to travel, and their consequent resulting momentum," the patentee stating that it is "the combination of a sufficiency of elastic force to receive the whole shock of a collision, and the means of absorbing it and preventing its reactive force, which accomplishes the object of reducing or converting railway engines

“ and carriages into an analogous condition to ‘non-elastic soft  
“ ‘ bodies.’ ”

Another part of the invention consists in employing “ a system  
“ of breaks to be brought into action by the apparatus above  
“ described, so as to stop the motion of all or any number of the  
“ wheels of the carriages, and thus diminishing the effect of their  
“ momentum simultaneously with the action of such momentum  
“ on the springs or buffing apparatus.” An arrangement is  
described in which projections connected with the buffing appa-  
ratus are made to press, on the latter being moved inwards to a  
certain extent, against spiral springs which then force break  
blocks against the wheels of the carriages.

Another part of the invention consists in so forming buffer  
heads that those at one end of a carriage shall be smaller than  
those at the other, the latter being, moreover, hollowed out, and  
the result being that when a number of carriages are brought into  
collision the small heads of the buffers of one enter the large  
heads of the buffers of the next, which prevents the heads from  
“ slipping away from each other.”

The details of the invention may be very variously modified, in  
some cases the buffer rods being mounted in cylinders, and the  
rods acting against certain springs which are sufficient for ordinary  
purposes, but bringing the cylinders into action upon other  
springs in case of extreme force being applied to the buffers.

[Printed, 8d. Drawing.]

A.D. 1857, May 12.—N° 1339.

BROOMAN, RICHARD ARCHIBALD. — (*A communication.*)—

“ Improvements in the preparation of steel, and in the steeling  
“ or manufacture of tyres, shafts, axles, and other forgings.”

This invention consists in the employment of bars of steel,  
arranged in bundles or faggots, and placed in a reverberatory  
furnace until raised to a white heat, and then to a welding heat,  
the bundles of metal being then covered with a preparation of  
silica and iron scales. When the bundles have attained such a  
heat that the metal will weld perfectly, they are placed under a  
hammer, and “ a perfect weld is the result.” The metal is next  
again raised to a welding heat, and again covered with silica and  
iron scales (the object of which is to prevent loss and injury from  
the action of the atmosphere upon the metal, the latter being then



again subjected to the hammer in order to be reduced to masses suitable in form and dimensions for the purposes for which it is to be employed.

Thus the tyres of railway wheels may be formed, as well as the tyres of vehicles to be used on ordinary roads, the arrangement in each case resulting in the production of a tyre of which the outer portion is steel, capable of bearing a large amount of friction and wear, while the inner part is of iron, which is calculated to prevent injury from shocks and from the effects of vibration, owing to its elasticity.

[Printed, *od.* Drawing.]

A.D. 1857, May 14.—N° 1369.

BARTHOLOMEW, CHARLES, and HEPTINSTALL, JOHN.—  
 “Improvements in machinery for rolling tyres and hoops for  
 “railway and other wheels; and also other articles made of iron  
 “and steel.”

In this invention machinery is used which is so combined that  
 “a ring of iron or steel may be expanded or contracted in  
 “diameter, and according to the form of rollers used so will be  
 “the section of metal produced.” On a suitable axis are formed  
 two rollers, this axis turning in suitable bearings, and being  
 driven by steam or other power. This axis is geared with and  
 drives another axis which is parallel to it, and also furnished with  
 rollers, the bearings of this axis being moveable towards or from  
 those of the first-mentioned axis, in order that as the metal of the  
 ring which is introduced between the rollers of one axis and those  
 of the other is reduced in thickness the rolling surfaces may be  
 brought nearer together. “One pair of these rolling surfaces are  
 “intended to act on the massive ring of metal to bring it roughly  
 “into the sectional form desired, whilst the other pair of rolling  
 “surfaces on these axes are made suitable for giving to the metal  
 “the finished sectional form desired,” and the finishing rolls  
 “are combined in their action with three or more other rollers  
 “which act on the exterior of the ring of metal, and the surfaces  
 “of such three or more rolls are made to correspond with the  
 “figure of the exterior surface of the finished tyre or hoop. The  
 “bearings of the second-mentioned axis are raised by means of  
 “two screws, suitably geared to move the bearings simulta-  
 “neously. The axes of the three or more rolls which are external

“ of the ring are arranged to turn in bearings which slide between  
“ guides, and such bearings are moved by screws, suitably geared  
“ to cause them to move to or from the ring of metal simul-  
“ taneously, and in such manner that the distance between the  
“ centre of the ring of metal and the centre of one of such three  
“ or more rolls will at all times correspond with the distance  
“ between the centre of such ring and the centre of each of the  
“ other rolls, by which arrangement or combination of machinery  
“ as the massive ring of metal is gradually reduced in thickness  
“ and the ring is increased in diameter by the pair of finishing  
“ rolls, the three or more other rollers will, by the gearing, move  
“ away and increase their distance from the centre of the ring of  
“ metal which is being rolled,” while “ by reversing the action of  
“ the gearing of the three rollers they will, when desired, be  
“ caused to approach the centre of the ring and cause the  
“ diameter thereof to be reduced, and thus may tyres and hoops  
“ of wheels which have been expanded by use be reduced in  
“ diameter,” the machinery, by the adaptation thereto of proper  
rollers, being also capable of rolling iron and steel into rings or  
cylinders for a variety of purposes.

The details of the invention may be varied; for example, instead of screws for regulating the distances of the external rollers from the centre of the ring, “ the principle of the hydraulic  
“ ram and other known means ” may be used; and instead of having one machine with rollers for roughing and others for finishing, such roughing and finishing may be performed in separate machines.

[Printed, 10d. Drawing.]

A.D. 1857, May 16.—N° 1392.

HILL, WILLIAM. — (*Provisional protection only.*) — “ Improve-  
“ ments in railway brakes.”

This invention is adapted for use “ in emergencies, when trains  
“ are to be stopped within very short distances.” It consists “ of  
“ a duplex stop catch apparatus, fitted up upon holding pulleys  
“ or discs fast upon the axles of the railway carriages, so as to  
“ enable the guard or brakesman to convert all the wheels in a  
“ train into frictional retarders. Each axle has fast upon it one  
“ of the holding pulleys, the periphery of which is fitted up with  
“ two *spring stop catches*, set in reverse directions, so as to act

“ for both directions of the running of the train. To the framing  
 “ of the carriages there is jointed at the parts corresponding to  
 “ each pulley a duplex detent, having reverse arms, so that when  
 “ the detent is turned upon its stud centre in either direction the  
 “ descending arm gears with the pulley catch on that side, thus  
 “ at once holding the axle from revolving and converting the  
 “ wheels into frictional retarders acting upon the rails. The two  
 “ duplex detents on each carriage are linked together by an  
 “ intermediate connecting rod, so that the two work in concert,  
 “ and to this rod is attached a cord or chain,” the cord or chain  
 of one carriage being united to that of another by suitable means,  
 and the whole thus forming one line, which “ can be easily drawn  
 “ when emergencies arise. So long as the brake is not required  
 “ the duplex detents stand clear of the catch pulleys, being  
 “ retained out of gear by small springs fitted up for that pur-  
 “ pose, but when it is necessary to stop the train suddenly the  
 “ attendant pulls the line which works the detents, and thus  
 “ brings all the arms on one side down within range of the  
 “ catches on the pulleys and stops all the wheels. The direction  
 “ of the running of the train obviously governs the direction in  
 “ which the line must be drawn, so as to bring down the proper  
 “ detent arms.”

As mentioned above this contrivance is only meant for use on  
 “ emergencies,” and for ordinary purposes “ the common brakes  
 “ must be used.”

[Printed, 4d. No Drawings.]

A.D. 1857, May 25.—N<sup>o</sup> 1468.

COUTANT, ALPHONSE.—(*Provisional protection only.*)—“ Im-  
 “ provements in forging and rolling iron wheels for railways.”

This invention consists “ in forging and manufacturing rail-  
 “ way wheels entirely of wrought iron or steel in a single piece  
 “ without spokes. The wheel is formed at first either by bending  
 “ or coiling bars, or forming a lump either with scrap iron or  
 “ refined cast iron, so as to have a suitable round boss, which is  
 “ carried into a heating furnace, and when at the proper degree  
 “ of heat it is welded and shaped under a steam hammer to form  
 “ a wheel blank of the required shape and size, a round hole  
 “ being also punched out through the centre,” and the blank  
 being then again heated and afterwards “ rolled out to its final  
 “ shape under a special train of rollers.”

These rollers are mounted upon two parallel shafts, driven by suitable gearing, one of these shafts being above the other, and its distance therefrom being adjustable by means of screws. The blank is placed between the rollers of the upper and lower shafts, and certain of these rollers are made to traverse to-and-fro on the shafts by means of screws, these rollers shaping those parts of the wheel between the boss and the rim, and other rollers shaping the exterior of the rim, which may be either flanged or otherwise, according to the shape of the rollers used. The blank rotates upon a vertical axis or gudgeon during the rolling process.

[Printed, &c. Drawing.]

A.D. 1857, June 3.—N° 1559.

ROY, EDMOND.—“Improvements in the construction of railway vehicles, for the special purpose of allowing them to run freely on short curved lines.”

According to the first part of this invention the axle bearings of railway vehicles “are fitted in their boxes in such a way that they can slide in an oblique direction whenever the wheels are running on curved lines, through the action exerted on the flanges of the wheels by the rails, which action brings the axles always at right angles with the said line of rails.” A mode of carrying out this part of the invention is described in which a railway vehicle is furnished with six wheels, thus having three axles, the central axle working in fixed bearings of the ordinary character, while the bearings of the other axles are capable of sliding obliquely in their boxes, and a method of applying the invention to a locomotive engine is also described in which such an engine is mounted upon eight wheels, having four axles, the outer axles working in moveable bearings, while the bearings of the inner axles, to which the driving power of the engine is communicated, are of the ordinary description, the patentee stating that engines with eight or ten wheels may thus be made “capable of running on short curved lines.” Other modifications of the invention are described, in some of which the inner axles work in moveable bearings, while those of the outer axles are fixed.

Another part of the invention relates to the mode of coupling railway vehicles, and consists in “applying a single connecting buffer block in the middle” between such two vehicles, such buffer block consisting essentially of two parts, which are so con-

ned by "surrounding pieces" and rings as to allow them to slide upwards or downwards, and to permit the draw bars to the ends which they are attached to assume oblique positions with relation to each other when the vehicles are passing round curves, but to prevent any "transverse motion" of the buffer block. The draw bars are suitably arranged in connection with springs, the whole apparatus thus serving the purposes of both buffers and draw bars, while they allow the vehicles of a train to pass round curves with greater facility than the buffers and draw bars ordinarily employed.

[Printed, 1s. 6d. Drawings.]

A.D. 1857, June 4.—N° 1569.

**THERRIN, LAURENT PROSPER.**—(*Provisional protection only.*)

"Improvements in railway breaks applicable to railway carriages, called railway lever breaks."

"This invention consists "in providing all or only part of the wheels" of railway carriages with breaks. "These breaks work directly behind each wheel of the carriages by the means of two horizontal and longitudinal iron bars, supported by two lever branches, pinned to a transversal spindle, resting upon bearings strongly fixed up to the bottom floor of the carriages. The bars continue all the length, being joined at each end of every carriage by a joined band disposed in such a way as to make the spindle turn."

"It is under the locomotive tender the different pieces which move the breaks are arranged either to pull close or to loosen. There, and even with the bottom of the tender, are fixed two cast-iron supports, in which two right angles are fastened with pegs at the extremity of their angles, so that they may turn with facility. At the extremities of two of the arms of the right angles are fixed with pegs the ends of the bars, horizontal and longitudinal, above mentioned. At the extremities of the other arms of the right angles are fixed the ends of two upright pieces, attached to two levers bearing chains at their extremities, which, by the means of an iron windlass carrying spokes and ratchet wheels, and worked by the guard, sets the whole system in motion."

Although this apparatus is described as being by preference connected with the tender, the inventor states that "it might be put anywhere."

[Printed, 4d. No Drawings.]

A.D. 1857, June 5.—N° 1582. (\* \*)

**WHEELHOUSE, THOMAS, and GREENWOOD, JOHN.**—  
(*Provisional protection only.*)—"Improvements in ventilating  
" vehicles or carriages in motion."

"We place or fix a fan under or upon the carriage, to be acted  
" upon or motion given to by the revolution of the wheels in  
" motion; to provide for the outlet or inlet of air from the said  
" fan we attach a tube or tubes of any suitable metal or material  
" to surround the vehicle or carriage either inside, outside, or  
" both, as may be found desirable; the terminus of the said tube  
" or tubes to be at any convenient portion of the carriage for  
" escape of the air. At or adjacent to each individual seat of  
" the carriage we may introduce a hole or slot in the tube or  
" tubes with a cover or slide to be opened or closed at the will  
" or convenience of the person occupying each individual seat, so  
" that each person may be able to ventilate at discretion. It is  
" quite evident that this invention is applicable to omnibuses,  
" railway and other carriages."

[Printed, 4d No Drawings.]

A.D. 1857, July 3.—N° 1859. (\* \*)

**MEARS, HENRY D., and HOULTON, WILLIAM, junior.**—  
"An improved seal for railway luggage vans, and for other  
" purposes."

"The invention consists "in a device for sealing freight cars,  
" express chests, custom-house packages, wine cellars, mail bags,  
" hatches of vessels, &c., in such a manner that they cannot be  
" opened without the seals being so violated as to render detection  
" certain; said device being the employment of one or two im-  
" pressible metallic discs for the purpose of receiving and holding  
" fast the ends of a wire, strip, tape, or string, which has been  
" passed through staples on the door and door frame of the apart-  
" ment to be sealed, said discs being made to grasp firmly each  
" other on any intervening or inserted substance, by compression  
" produced by a blow from a die, or by the action of pincers, or  
" any equivalent means, which blow or compression at the same  
" time fixes upon the die to which it is applied an inscription or  
" seal."

[Printed, 6d. Drawing.]



A.D. 1857, July 7.—N° 1890.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from Monsieur Mouret.*)—(*Provisional protection only.*)—"Improve-  
ments in connecting carriages and wagons on railways."

This invention consists "in certain transverse connections  
for preventing the oscillation of trains in motion by establishing  
a rigid connection laterally throughout the train, and in pro-  
viding additional longitudinal couplings."

"The effect of the transverse supporting connections is to  
ensure and maintain coincidence between a central line drawn  
along the roof of every carriage and an imaginary line passing  
above the central line of the road."

The invention is illustrated by drawings which represent the  
"transverse connections" as consisting of two bars rising dia-  
gonally from the end of one carriage, and being united at their  
upper ends, such upper ends being secured to the upper ends of  
two similar bars rising in the same manner from the end of the  
next carriage. The additional couplings, "which are to be fixed  
at the sides and employed as well as the usual central coup-  
lings," apparently consist of longitudinal bars connected by  
hooks placed diagonally, the inventor stating that coupling chains  
may thus be dispensed with.

[Printed, 8d. Drawings.]

A.D. 1857, July 7.—N° 1891.

**HENRY, MICHAEL.**—(*A communication from B. A. Soullié and G. Vigneau.*)—"Improvements in railways, and waggon used  
therewith, in loading and discharging coals, stones, ballast,  
earth, and other materials."

An important point in the present invention is the affording  
of means for the passing of railway waggons from one line of  
rails to another without turntables, and for their being loaded and  
discharging their contents at any required point with increased  
facility. The waggon passes from one line of rails to another  
"by a short curved way, which may be so constructed as to be  
shifted bodily, when required, by a travelling crab or similar  
means."

The waggon is mounted either on plain wheels or independent  
axles, kept on the curved way by horizontal wheels connected to  
the waggon by arms, and working against the lateral faces of the

rail, or on wheels of different or differential diameters; or when the wheels are flanged as usual, additional loose wheels are added to carry it on the curve, the rails of the curved way being for such waggons of higher level than those of the rest of the line (and of different gauge), and the wheels being guided and kept on the rails by being made to travel in hollow or trough rails, or by means of horizontal wheels or rollers working between the inner faces of an additional line of rails provided for the purpose on the curved way. The waggon is formed in two parts, namely, an upper or body part or tilting carriage, and an under part, truck, or travelling carriage. The upper or body part is mounted on wheels running on rails fixed on the top of the lower carriage or truck, so that when such body part is set free (by withdrawing a pin from one side of a block which retains its middle axle, or otherwise), it will run on the rails upon the truck, and tilt over on one side for the discharge of its contents, being kept from falling off by suitably placed abutments. The upper part or tilting carriage opens at the sides by means of swinging or folding doors, so hung on hinges contrived in posts as to open quite back over the front and back ends of the carriage. "A convenient mode of arranging the upper carriage wheels is to place one at each end of an axle running midway along the frame, and one at the middle of each end of the frame."

The invention is described at some length, and under various modifications.

[Printed, 1s. Drawings.]

A.D. 1857, July 10.—N<sup>o</sup> 1927.

WOODMAN, WEBSTER.—(*A communication from J. W. Alden.*)  
—"Improvements in railroad wheels."

This invention consists essentially "in constructing a railroad wheel of two wrought-iron plates combined with a suitable hub and united at the flange."

A mode of carrying out the invention is described in which one plate forms the front of the wheel, as also the tread and half the flange, a second or back plate being combined with this, and parts of such back plate forming the other half of the flange, these plates being dished or bent towards each other at the parts between the tread and the hub, and the latter, which may be of either cast or wrought iron, being placed between the central portions of the plates, and the whole united together by riveting or

any other suitable means, a steel or chilled cast iron tyre being placed, if desirable, upon a wheel thus formed, but such tyre forming no part of the invention, "as the wheel is in a measure " complete without it." Instead of using a hub which connects the central parts of the plates, only the whole space between the two plates may be filled with cast iron, "which may be poured into " it in a molten state, or first cast to the required form."

[Printed, *ed.* Drawing.]

A.D. 1857, July 11.—N° 1937.

DENIZOT, BERNARD, and FLIPPS, CHARLES.—(*Provisional protection only.*)—"An improvement in the construction of railway breaks."

According to this invention the break "consists of a bar having " a hole formed with a female screw at each end, which bar can " be attached to or removed from the axles of the wheels when " required. On the axis of each wheel is formed a male screw " and collar. The break bar is held in the position to allow the " axles to rotate by a hook on a moveable arm." When it is necessary to apply the break bar, the cylinder is turned on which is wound a chain connected with a coupling rod; this causing a detent to set free the hook of the moveable arm, "when the break " is immediately forced by springs against the male screw, which " enters the female screw of the break bar and thus locks the " wheels. The same apparatus may be applied to each carriage " and to the locomotive, and thus cause the whole train to be " suddenly stopped."

[Printed, *4l.* No Drawings.]

A.D. 1857, July 15.—N° 1963.

MOULIN, FRANÇOIS.—"A new improved railway brake."

According to this invention the brake is constructed, in the first place, "of a jointed frame of the shape of a parallelogram," which is carried by a "middle piece" resting upon the axles of the vehicle to which the brake is applied, this frame being capable of being so moved by a lever as to bring certain buffers or stops carried by the frame into such a position as to come into contact with cams or cogs fixed upon the axles; these cams or cogs then preventing the axles from revolving, and so stopping the motion of the carriage. In order to reduce the shock caused by the cams striking the buffers, the latter are so mounted as to be capable of

sliding for a short distance in their bearings, and are provided with springs which are compressed when they are struck by the cars.

These arrangements may be applied in conjunction with brake apparatus of the ordinary character, the latter serving for general purposes and the former only being brought into action in case of emergency.

[Printed, 8d. Drawings.]

A.D. 1857, July 16.—N° 1977.

MATHEWS, GEORGE SAMUEL.—“Improvements in railway “breaks.”

This invention relates to those railway breaks “which act by “the friction of shoes or skids brought to bear against the rails “on which the carriages are travelling.” The skids, according to this invention, are mounted over the rails between the wheels of the carriage to which they are applied, and are each connected by “screw rods” to a block placed above it, a strong screw passing through this block and through the framing of the carriage, the arrangement being such that by turning this screw in one direction the skid is forced down upon the rails, while by turning it in the other direction it is raised therefrom. In order to actuate the skids of all the carriages of a train simultaneously, a cross lever is placed on the top of each of the screws by which they are raised and lowered, the different cross levers being connected by parallel bars or rods, which may be operated upon by any suitable means so as to turn the screws in either direction. The skids may thus be pressed upon the rails with great force, so much so as, if desirable, to lift the carriage wheels off the rails. In order to ease the strain upon the screws and “screw rods” when the skids are in action, certain bars or rods are jointed to the skids, which not only connect them with each other, but with the framing of the carriages, these rods being, however, so disposed as not to interfere with the upward and downward motion of the skids. The invention includes a mode of facing the skids with wood, in which “the end grain of the wood is presented as the friction “surface,” instead of such wood being presented “sideways.”

[Printed, 10d. Drawing.]

A.D. 1857, July 27.—N° 2041.

SAINTARD, NICOLAS.—“An improved break for railway and “other carriages.”

This invention consists "in mounting wheels or rollers on fixed axes behind or in front of the ordinary carriage wheels, and in arresting the rotation of these wheels by bringing between the additional wheel or roller and the carriage wheels a wedge or a cam fixed upon the additional wheel." The patentee proposes to have his breaks fitted on both sides of the carriages, and recommends "their being applied on railways to every carriage in the train, so that when the train is made up a connection may be carried from the guard's van to every break." And as railway carriages "have to travel sometimes one end forward and sometimes the other," he fits "two cams to each supplementary wheel, one to act and cause a jam by being pulled up when the carriage is progressing in one direction, and the other to cause a jam by being pulled down when the carriage is moving in the contrary direction," springs being sometimes interposed between the cams and the wheels to which they are connected in order more gradually to arrest the rotation of the running carriage wheels.

The details of the invention may be varied, but an arrangement is described in which the breaks or cams are brought into action through the medium of small cords or chains attached to a common cord or chain worked by a shaft carrying grooved pulleys and mounted in suitable bearings on the tender, the arrangement also including means by which the breaks are brought into action either in case of the locomotive and tender being suddenly arrested by an unforeseen obstacle, or of their leaving the rails, a certain rod in the first case, and a certain "safety wheel" carried by the tender in the second, being made to bring about that result, and the tender is also provided with T-bars or plates so contrived as to prevent its approaching too near the first carriage when the train is being backed, this preventing the breaks from being then brought into operation. The patentee also proposes to mount the bodies of the carriages "independent of their supporting frames," and so that they may move slightly therein in case of collision, both bodies and frames being furnished with buffers, and an arrangement of springs and inclines being also contrived for the purpose of lessening the effects of collision.

[Printed, 8d. Drawing.]

A.D. 1857, July 27.—N° 2042.

MORTERA, AUGUSTIN.—(Provisional protection only.)—"Improvements in coupling carriages on railways."



These improvements consist "in fitting on the end of one carriage, between the two ordinary buffers, a supplementary buffer head, and on the end of another a hinged spring catch, which enters the buffer head, and is there maintained by a latch, or by a spring or other equivalent, or by a key. The whole of the carriages for a train can be coupled without the aid of attendants, and in order to uncouple them, the catch has to be raised, or the key or a pin removed."

[Printed, 4d. No Drawings.]

A.D. 1857, July 27.—N<sup>o</sup> 2046.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication.*)—"Improvements in apparatus for retarding and stopping carriages on railways."

This invention consists "in so combining apparatus, that the breaks used therewith will be out of action so long as the power of the locomotive engine is acting to move the carriages attached thereto," but that when "the speed of the locomotive engine is reduced below that of the carriages attached thereto, the breaks will be applied to the wheels, or caused to act in such manner as to tend to prevent the further movement of the carriages."

The "power of the locomotive engine is applied by means of a sliding bar to each carriage, on which there are two stops or projections, one to come into action on an elastic stop or projection on the carriage when the locomotive engine is moving forward, and the other on another elastic stop or projection on the carriage when the locomotive engine is moving backward. The ends of these sliding bars are to be arranged to be readily connected with each other, in order that the several sliding bars of the carriages composing a train may act as one bar, allowing, however, sufficient lateral action for passing round curves." The object in making the stops on the carriage elastic is, that there shall be no objectionable shock when the sliding bars are moved so as to change the stops. The break apparatus, whatever be its arrangement, "is to be such that the breaks shall be off the wheels when either of the stops of the sliding bars is pressing against either of the fixed stops on the carriage." The patentee states that he prefers an arrangement, which he thus describes:—"The breaks are applied in each case to the two ends of a bar,



“ which is carried by a lever or levers transversely of the carriage,  
 “ and the breaks of each bar are made to act simultaneously on  
 “ the peripheries of two wheels on opposite sides of the carriage,  
 “ and they are caused to act immediately the further progress of  
 “ the carriage (in the direction in which it has been moving)  
 “ becomes resisted by the locomotive engine, or by the sliding  
 “ bar carried by the preceding carriage. In each case two of the  
 “ above-mentioned transverse break bars are suspended from the  
 “ ends of two levers, one break bar on each side of a pair of  
 “ wheels, and one break bar is arranged to act when the carriage  
 “ is going in one direction, and the other when the carriage  
 “ is moving in the opposite direction, and the respective break  
 “ bars are brought into action by connecting rods and counter  
 “ levers, actuated by levers carried by the break bars, or by other  
 “ convenient means. The levers attached to the break bars are  
 “ respectively acted on by projections on the under side of the  
 “ sliding bar, by which the power of the locomotive engine is  
 “ applied to the carriages.”

[Printed, 4d. No Drawings.]

A.D. 1857, July 27.—N° 2048.

DANVERS, PATRICK, and BILLINGS, GEORGE WHITFIELD.  
 —(*Provisional protection only.*)—“ An improved means for rolling  
 “ hoops and wheel tyres.”

In this invention the metal intended to form the hoop or tyre  
 is bent up by ordinary means, and, the ends having been welded  
 together, is placed in a heated state between two rollers, the sur-  
 faces of which are so formed as to give the proper sectional form  
 to the hoop or tyre, which may thus be either plain or flanged,  
 “ as for locomotives, &c.” The rollers are opened to receive the  
 “ hoops or tyre, or forced together to roll the same by means of  
 “ suitable screws and gearing, and the said rollers are connected  
 “ to each other and driven by suitable gearing.”

Above the rollers is a horizontal slide, “ fitted so as to be adjusted  
 “ vertically until it stands at the line of the diameter of the hoop  
 “ or tyre to be rolled. On this slide two rollers are applied on  
 “ sliding blocks in such a manner that a screw fitted in aforesaid  
 “ slide with right and left handed threads upon it shall project  
 “ or retract the said rollers to the diameter of the hoop or tyre,  
 “ and these rollers, which gauge the diameter in connection with

" the before mentioned compressing rollers, form the tyre or hoop perfectly round, and of the correct size and shape."

" A roller or rollers applied on the aforesaid slide, taking the edges of the hoop or tyre, keep the same correctly in position."

[Printed, 4d. No Drawings.]

A.D. 1857, July 28.—N° 2061.

TILL, THOMAS, and GARDINER, WILLIAM.—(*Provisional protection only*).—" An improvement or improvements in preventing collisions on railways."

This invention relates to preventing collisions on railways by causing one locomotive or carriage so to act upon apparatus provided for the purpose as to arrest the motion of any other locomotive or carriage which may approach within a given distance of the first.

The apparatus employed consists of a series of levers placed along the line of railway at a quarter of a mile or other suitable distance apart, such levers being "connected together alternately" by wire or otherwise, that is to say, the first is connected with the third, the second with the fourth, and so on." When a locomotive or carriage passes over one of the levers it places such lever in such a position that a following locomotive or carriage is stopped or arrested thereby, but when the first locomotive or carriage has arrived at the third lever, it so acts thereon as to depress the first, which will then no longer oppose the passage of a following train. The same result is produced by the second and fourth levers, and so on in succession.

The levers may be made to act in various way in stopping engines and carriages, no particular arrangement for the purpose being set forth, but by means of suitable mechanism the levers may be made to shut off the steam from the locomotive, to sound the whistle, and to apply the breaks to both engine and carriages.

[Printed, 4d. No Drawings.]

A.D. 1857, August 1.—N° 2095.

TATLOW, JAMES, and HODGKINSON, HENRY.—(*Provisional protection only*).—" Certain improvements in railway breaks and signals."

This invention consists in applying to an engine, tender, or break van, or carriage, a break or drag, in such manner that the whole, or a portion of the weight of such locomotive, tender, van, or carriage, "shall be taken off the wheels and transferred to a " shoe or drag."

Beneath the engine or vehicle to which the invention is to be applied is placed a shaft, which carries at each end a bar or rod, the latter supporting a break or drag, which runs above the rails, and is provided with a flange similar to that upon the wheels of the engine or vehicle. The break or drag may be plain on the under surface, or such surface may be toothed, in order to increase the grip or bite upon the rails when brought into contact therewith. The drag may also be formed in two or more pieces, so that when the part most subject to wear becomes destroyed, it may easily be replaced. On the top of the drag is a vertical bar, the upper part of which is formed into a rack, the teeth of the latter being in gear with those of a pinion, which, on being turned by means of suitable gearing and a hand wheel or other contrivance, such as ordinarily used for applying breaks, will cause the drag to be applied to the rail with such force that a train furnished with these drags will be stopped much more quickly than by breaks acting upon the wheels, the wear and tear of the tyres of the wheels being also much diminished. Sand or other suitable material may be passed through a hole in the drag, so as to increase the friction.

In connection with this drag the inventors propose to use an improved signal, but this will be noticed in another series of abridgments.

[Printed, &c. No Drawings.]

A.D. 1857, August 14.—N<sup>o</sup> 2169.

DRAPER, SAMUEL. — "Improvements in the manufacture of " handles and fastenings for doors of railway and other carriages."

According to this invention the stem or spindle of the handle is formed of cylindrical rod iron, and may be either of the same diameter from end to end, or be flattened on two sides as far as the bottom of the tongue or fastening button, which is placed upon this spindle. The tongue or button is formed in three parts, the main part having at the end by which it is fixed to the spindle

two plates, one on each side, these plates being furnished with projections by which they sustain a friction roller which acts against a suitable spring. The handle itself is formed by a cross-bar of iron screwed upon or fixed to the end of the spindle, there being placed over this a hollow shell of sheet brass or other suitable metal, and a tube of similar material being inserted into the shell about midway of its length, and covering a portion of the spindle, a pin passing through both tube and spindle, and fluid metal being run into and filling up the spaces in the interior of the parts. When the tongue is to work within a case or lock let into the door the patentee uses by preference a flat spindle, the hole in the tongue or fastening button corresponding therewith, "which may be made by two side rods, fastening them" and the spindle together by the running in of the fluid metal "as before named, or if they are made in the ordinary way by the" handle being cast in solid brass, &c., so that the flat part of the "spindle may effectually move the tongue or fastening button" with its projected roller. The tongue or fastening button with "its projection to hold the friction roller can be made in one" piece at a greater expence."

[Printed, *ed.* Drawing.]

A.D. 1857, August 15.—N° 2176.

HADDAN, JOHN COOPER.—(*Provisional protection only.*)—"Improvements in the construction of railways, and of the carriages" to be used therewith or thereon."

This invention has reference more particularly to localities and circumstances in which it becomes desirable to economise the lateral space or width to be occupied by the intended railway, as in the case of laying down a railway upon an existing street, road, or way, and the invention consists in disposing such railways in two or more lines placed one over another, suitable lifts or inclines being provided for shifting the carriages from one line to another, and forming communications between such lines.

Carriages to be used upon such lines of railway are adapted for the purpose by "forming them with the floor or bottom lying" below or at the level of or nearly at the level of the rails."

Such rails may be supported by suitable platforms, the lower rails being intended for the "slow street or road traffic," and the upper level or levels serving the purpose of an ordinary railway.

Either horse or locomotive power may be used in propelling carriages on such rails. In the former case ways or roads must be provided for the animals to run upon, but in the latter case a mere skeleton platform or framing will be sufficient to support the rails. The lifts for raising and lowering the carriages may be actuated either by hydraulic or by mechanical arrangements, and the inclines may be variously disposed, the rails of the upper line or lines being in some cases so arranged as to be removeable at the parts at which the transfer of carriages from one line of rails to another is required.

The carriage wheels "are external to the body, and with what "are technically termed inside bearings by carriage builders," and in consequence of "the limited available contemplated "height" the inventor further proposes to pass the axles through the bodies of the carriages, and to arrange them between the compartments into which the carriages may be divided, so as to interfere as little as possible with the space to be occupied by the passengers.

[Printed, 4d. No Drawings.]

A.D. 1857, August 20.—N° 2210.

GOUGH, THEOPHILUS, and MARGERISON, JOSHUA.—(*Provisional protection only.*)—"Improvements in braking apparatus "for vehicles used on railways, or on other roads or ways, parts "of which are applicable for communicating between guards and "drivers of trains."

According to this invention the brakes of any number of railway carriages may be brought into action upon the wheels simultaneously, and such brakes may be actuated by either steam or hand power, aided by the momentum of the train itself. Each carriage is provided with a longitudinal sliding bar, having buffer heads, these bars, when the carriages are coupled, forming one continuous line throughout the train, and resting on framework attached to the axle bars of the carriages. In connection with these bars are transverse levers with elliptical heads, and on the longitudinal bars being moved either backwards or forwards, such levers are made to operate by an excentric action on the ends of rods connected with brake blocks, and press the latter with great force upon the wheels of the carriages. The backward or forward movement of the sliding bars may be produced by rackwork and

a pinion, moved by a wheel or lever; or by means of an excentric; or such motion "may be obtained from the engine." The longitudinal bars also form a means of communication between the drivers of the engine and the guards of the train. The invention is described solely with reference to railway carriages.

[Printed, 4s. No Drawings.]

A.D. 1857, August 20.—N° 2217.

INGRAM, THOMAS.—"Improvements in railway breaks."

According to one part of this invention, each carriage of a train is furnished with a tubular shaft, mounted beneath the body of the carriage, and the shaft of one carriage being connected to that of another by certain sliding pieces, coupling clutches, spring catches, and other mechanism so contrived as to prevent derangement of the shafts by the oscillation of the carriages or their varying distance from each other. The breaks are connected to cross shafts, there being upon the latter levers, to the ends of which chains are attached, these chains being also attached to barrels or small drums on the tubular shafts, and the whole of the breaks being pressed upon the wheels of the carriages by turning the shafts, which from their connection can be made to rotate simultaneously, and causing the chains to be coiled upon the drums.

In another modification of the invention, the breaks, cross shafts, and levers are the same as those already mentioned, but the levers are connected by chains or otherwise with arms on a third cross shaft, placed midway between the other two. "The free end of each lever is connected with an arm projecting in opposite directions from the central cross shaft, so that such levers will be raised whichever way the central cross shaft may be caused to turn, and so brings the breaks against the wheels. From the central transverse shaft a lever depends, carrying at the lower part two chain pullies, and also close to the shaft two similar chain pullies, over which two chains pass, one extended in each direction towards the ends of the carriage, and terminating by spring hooks, by which they are united to similar chains of the adjoining carriages. A screw swivel is used to take up the slack of the chain required."

The chains, which are in two parts for each carriage, are each passed under one of the lower pullies and over one of the upper



ones, and thence return to drums fixed upon other cross shafts placed near the ends of the carriage. These shafts are furnished with pinions, which are in gear with racks formed on the buffer rods, so that when the buffers are forced inwards, the drums rotate and take up the "slack" of the chain created by such inward motion of the buffers. By this means "the chain of communication is at all times kept in tension, whatever may be the force exercised to compress or contract the buffer rods." Instead of attaching the chains to drums, however, they may be in some cases attached to the buffer rods themselves, and instead of employing break blocks to act upon the wheels, the apparatus may be made to operate metal straps encircling break drums fixed upon the carriage axles. Instead of the chains, rods may be used, and the whole apparatus employed may be brought into action by the guard or the engine driver of the train, through the medium of suitable gearing, by which the tubular shafts used in the first modification may be turned, or the "chain of communication" used in the second modification be made to move the levers combined therewith. Or steam power may be applied for this purpose.

Another part of the invention relates to compensating for the unequal wear of the break blocks of railway carriages, and consists in connecting the block of each break to a plate, which is jointed at its upper end to the main arm of the break, there being at the lower end of this plate a clawker, which takes into fixed ratchet teeth, and prevents the block from at any time receding beyond a certain distance from the wheel. An inclined ratchet slot piece is placed on each side of the block (which is supposed to be of wood) and connected to the break arm, and a cross pin or bar is passed through these slots, behind the wood, the break arm acting upon the wood through the medium of the dropping pin, and the result of the arrangement being that in proportion as the wood is worn away in front, "it is prevented performing the retrograde movement (with the motion of the brake arm, which has always the same motion), an amount equal to the extent to which it may be worn away," the wood being removed from contact with the wheel by means of a spring or weighted lever, which likewise prevents the dropping pin from falling too low. Various modifications of the details of the invention are described.

[Printed, 1s. 2d. Drawings.]

A.D. 1857, August 24.—N° 2235.

BLANC, FRANÇOIS JULES.—“An improved tire for the wheels  
“ of railway carriages, engines, and tenders.”

According to this invention, a bar of iron, of rectangular section, is bent so as to form a ring, the ends having been previously “made wedge-shaped,” and one overlapping the other so as to form a joint. A second ring, of steel, having a flange thereon, is then made in the same manner, but sufficiently large to contain the first within it, and the first having been placed inside the second, with the joints of each in an opposite direction to the other, the two are heated to a welding heat in a reverberatory furnace, and then placed in a circular mould of metal. A mandril or punch is then inserted within the inner ring, and struck by a pile hammer, the punch, which is of somewhat conical form, being thus driven down through the rings, and effecting the welding of them together “by lateral pressure.” As soon as the punch reaches the bottom of the rings, the mould is overturned, and the rings become disengaged by contraction; but, if desired, this overturning may be avoided by making the mould longer, and forming in its lower part an opening sufficiently large to give passage to the punch, the latter being struck after it has reached the bottom of the rings until it falls to the bottom of the mould, when it is withdrawn through the said opening. The punch, in passing through the rings, carries with it the excess of iron, and to “lessen the waste, and at the same time to remove it by the action of the punch,” the patentee places in the mould a ring of cast steel, the diameter of which is adjusted so as to leave the least possible play for the passage of the punch, the edge of this ring detaching the waste iron carried by the punch, and the ring, moreover, preventing the mould from scaling under the action of the hammer. By varying the thickness of this ring, the same mould may be used for tires of different widths. Instead of the punch and hammer being separate, they may, if desired, be united.

[Printed, &c. Drawing.]

A.D. 1857, September 3.—N° 2308.

GARDINER, PERRY G.—“New and useful improvements in the  
“ conical coiled steel railroad car spring,” and also “new and  
“ useful machinery for preparing, coiling, and converting steel

" plates or bars into such springs, and for testing and measuring the strength of such springs."

In the manufacture of the improved car spring "a thin narrow steel plate is used, of sufficient length to form the coil in one piece." The patentee mentions that in order to form the base and apex of the spring so that each may present a flat and even surface "it is necessary that a piece should be cut angularly from the sides of the plate which form the lower and upper portion of the coil," the end of the plate requiring to be also cut true and straight, so as to fit into the slot in the mandril on which the spring is formed "at the right angle." The first part of the invention relates to means of effecting these objects, for which "a very powerful shearing machine is required," and the improvements embrace a "moveable bracket plate," which carries the lower of two steel cutters; adjustable stop or guide plates and guide bars for regulating the position of the plate under operation; and an "eccentric lever," which holds the plate steady while the shears or cutters are acting upon it.

The invention further embraces a mode of "creasing" the plates, this being effected by the use of a V-shaped roller combined with a "flat-faced" roller, and a carriage having upon it an adjustable stop or guide plate for the purpose of bringing the plate to be creased into the proper position.

As regards the machinery for coiling the plates into the proper form, the invention embraces a "cone mandril," formed "in two pieces, so that the spiral cone will slide off and upon the straight part of the mandril, the straight part having a slot or groove and being an eccentric;" also a certain sliding frame "for carrying or feeding the steel plate upon the cone mandril," and carrying an adjustable table and adjustable rollers for regulating the inclination of the plate; also a "loose or sliding pressure roller," acted upon by certain arms connected to the sliding frame mentioned above, and which directs the steel plate upon the cone, an "intermediate guide plate" aiding in this operation, and certain arrangements being made by which the movements of the mandril are governed. The coil, when completed, is disengaged from the mandril by the use of a "disengaging tool," which is of the exact diameter of the straight part of the mandril upon which it is to act, and is of a similar external shape with the "mandril in reverse," this tool acting in combination with a certain platform, a moveable plate, and other apparatus.

The invention further includes the employment of a plunger in combination with an adjustable spindle carrying a "knife-edge" pivot," a guide plate, and a balance beam with a scale platform and weights, in order to "test the power of the spring, and at the same time measure the pressure."

The details of this invention are set forth at some length, but are too complex to be understood without the aid of the drawings annexed to the Specification.

[Printed, 1s. 2d. Drawings.]

A.D. 1857, September 12.—No 2375.

BUTLER, JOHN, and PITTS, JOSEPH.—(*Provisional protection only.*)—"An improvement in fastening tyres on wheels for railway carriages."

This invention consists "in fastening the tyre on wheels for railway carriages by bolts or keys passing through slots or grooves made on the exterior of the inner rims or upon the ends of the spokes or arms, and also through a portion of the tyre of such wheels, such bolts or keys being placed parallel or in a like direction to the axis of the wheel."

[Printed, 4d. No Drawings.]

A.D. 1857, September 16.—No 2406.

FONTAINEMOREAU, PETER ARMAND LE COMTE DE.—(*A communication.*)—"An improved railway brake."

This invention consists "in immediately stopping or reducing the speed of railway trains when in motion by means of improved brakes acting against the wheels and rails and by racks and wheels, the whole being put in action by a single lever."

On each axle of each carriage are two spur wheels, having pointed teeth, and midway between the two axles is mounted a cross shaft upon which are fixed arms, projecting upwards and downwards, and having jointed to them rods which are also jointed to break blocks. To these arms are also jointed other rods carrying racks, and by means of a longitudinal shaft furnished with a lever, and provided with short arms and links, capable of moving the racks upwards and downwards, the latter may at any time, by turning this shaft in one direction, be brought into gear with the toothed wheels on the axles, the result being that the brakes are instantly moved in opposite directions and

pressed against the wheels of the carriage, and, from their peculiar form, upon the rails also. The longitudinal shaft of one carriage is connected with that of another by suitable means, and thus the movement of a lever on any of the shafts brings the brakes of all the carriages of a train into simultaneous action. By turning the longitudinal shafts in the other direction the racks are released from the toothed wheels, and certain springs then remove the brakes from the wheels of the carriages and the rails. By these arrangements the stopping of a train may be effected almost instantaneously, but in order to produce a progressive stoppage when desirable, levers may be placed in the cross shafts and connected to chains and other apparatus which may be worked by the guard of the train, the racks and toothed wheels not being brought into use. The brake apparatus is supported by bars bolted to the grease boxes of the axles, thus rendering it independent of the framework, and preventing it from being affected by the rising and falling of such framework on the springs.

[Printed, *8d.* Drawing.]

A.D. 1857, September 25.—N° 2475.

KELSHAW, JOHN, and WILKINSON, JOHN.—“Improve-  
“ments in self-acting couplings for railway carriages and  
“engines.”

In this invention the patentees “arrange the draw bar at one  
“end of the carriage so as to be capable of vibrating or oscillating  
“upon a pivot or joint, and counterbalance it with weights or  
“springs to keep the coupling end in a central position when  
“disconnected.” To the draw bar at the other end of the car-  
riage is applied a funnel-formed mouth piece or socket, which may  
be either fixed or capable of vibrating, and which will “guide and  
“receive the end of the other or first-named draw bar. A pin or  
“cotter passes through this socket and the other draw bar end  
“when two carriages are brought together, by pressure of weight  
“or spring, such pin being drawn back or out when the carriages  
“are required to be disconnected by means of a shaft across or  
“extending to each side of the carriage, and the said pin is held  
“out by a spring catch, which the draw bar end displaces when  
“pushed into the socket of another carriage, allowing the pin to  
“drop or pass through, thereby securely coupling the two  
“carriages together.”



As a matter of convenience each end of a carriage may be fitted with both bar and socket, so as to render it immaterial which ends of the carriages are brought together. And certain ratchet wheels may be so combined with the apparatus that upon a number of carriages being brought together, some of them will not couple; although the rest do so.

[Printed, 10*l*. Drawing.]

A.D. 1857, September 25.—N<sup>o</sup> 2480.

JACKSON, JAMES.—“Improvements in the manufacture of  
“tyres for railway and other wheels.”

This invention consists “in manufacturing tyres for railway and  
“other wheels by casting in a mould a circular mass of steel,  
“which is either plain on its edge if an ordinary tyre is to be  
“made, or flanged if a railway tyre is to be made; from the  
“centre of the mass so cast a circular piece is cut or punched by  
“suitable tools, and the ring of steel thus obtained is extended  
“by passing it between rollers, arranged in the same manner as  
“the rollers which are now used for extending and finishing  
“ordinary welded up tyres.”

An arrangement is described in which a mould is employed which is composed of two parts, which are bolted together for use, the space in the interior of the mould being so contrived as to cause the mass, when cast, to be of a thickness corresponding with the width of the tyre to be made, but considerably less in diameter, the mould being provided with a “running hole,” through which it can be filled with melted metal. The latter having solidified is then removed from the mould, by separating the two parts of which the latter is composed, and then reheated in a furnace, the mass being then laid upon an anvil, and the central portion removed by blows from a large punch carried by a powerful steam hammer, the hammer itself then striking and solidifying the ring thus formed. The latter is then again heated and rolled out to the requisite size in the ordinary manner. In place, however, of producing a ring by these means such a ring  
“may be at once cast by the use of a suitably formed mould,”  
and a “core” adapted thereto. And if desired an oval instead of circular ring may be thus cast, and afterwards brought into a circular form “by forcing it on to a mandril.”

[Printed, 8*d*. Drawing.]



A.D. 1857, October 5.—N° 2547.

RICHARDSON, WILLIAM, and RICHARDSON, GEORGE.—

“Partly or wholly stopping wheels of carriages of every description when in motion,” by a “break or breaks to be applied by the motive power.”

This invention is set forth in a somewhat vague manner. The patentees claim as one part of their invention “the application of breaks to any description of carriage or wheeled vehicle, to be applied at any angle, from a vertical to an horizontal inclusive, or from ninety degrees to forty-five degrees, including any angle;” “and the same to be applied by and taken off the wheels by the motive power at the pleasure of the person in charge of the carriage, vehicle, or motive power; or, if necessary, to apply a spring or springs to force off the break after they have been applied by the motive power; also a stop, which is applied at the end of the pole or shaft by the person driving or in charge, which stop can be placed by dropping a block of wood with a spring or pulley by the coachman or driver, whereby the motive power can back the carriage without the break or breaks acting or applying to the wheel or wheels, or in some cases a pin, or bolt, or clamp can be used by the person in charge of the motive power.”

They also claim to be “the first inventors to hang breaks on a circle,” so that they can be regulated by a thumbscrew, “and made forty inches in length if necessary, and such break or breaks to be applied to any description of carriage or vehicle by the horse or horses, or any other motive power, and to be disconnected by the horse or horses or any other motive power, or with a spiral spring or any other description of spring or springs to be connected near the break or breaks or at other part of the rod or rods connected with the break or breaks leading to and from the motive power; and when necessary to keep the breaks to their work or assist the motive power in the application of the break, the same can be done by the coachman or any other person in charge by a small chain” connected to any of the rods mentioned above, “and connected with a treadle or lever which will be placed near the man’s foot.”

When the break or breaks is or are to be applied to railway carriages or vehicles, the patentees cause “the steam engine or any other motive power to apply the break or breaks by the use

" of steam or air, or hydraulics, or electricity passed through a " tube or tubes, pipe or pipes, syphon or syphons " of any size that may be necessary, each carriage, if desirable, of a train of carriages being provided with a tube or syphon, and such tubes or syphons being suitably connected by sliding and other joints, and forming a communication with cylinders in which rams or pistons are placed, and connected by rods with suitable breaks, and which rams or pistons may be acted upon so as to apply such breaks to the wheels by air, steam, water, or electricity, which is to be forced through the tubes or syphons, the breaks, when the rams or pistons cease to be acted upon by the air, steam, water, or electricity, either falling from the wheels by their own gravity or being forced back by springs.

The invention also includes the application of " extra buffers to " the ends of railway carriages as a prevention against their " tumbling over each other when suddenly checked." Either one or two of these extra buffers may be applied to each carriage, an arrangement being described in which it is apparently meant that one buffer shall project in front of the middle of the top of the carriage, and be connected to diagonal bars passing from the corners, the whole being " carried by a spring along the top of " the carriage, the buffer being in the centre of the spring or " springs longitudinally or transversely."

One arrangement is shown in the drawing annexed to the Specification in which pipes arranged beneath a railway carriage are apparently meant to convey steam, water, or condensed air to cylinders containing pistons or rams, to the rods of which other rods are jointed, and the latter also jointed to other rods by which the breaks can be moved to and fro, the first mentioned rods forming an angle with each other when the breaks are not in contact with the wheels, but being thrust into a straight line when the breaks are applied. No intimation is given, however, of any mode of causing " electricity " to pass through the tubes.

The patentees further include in their claims the covering of the tubes or syphons with an oily or greasy substance, and this with leather or some other substance which will prevent such oily or greasy substance from leaving the tubes or syphons, the object of this being to prevent frost from interfering with the free passage of water or other matter when introduced into such tubes or syphons.

[Printed, &c. Drawing.]

A.D. 1857, October 5,—N° 2547.

RICHARDSON, WILLIAM, and RICHARDSON, GEORGE.—

“Partly or wholly stopping wheels of carriages of every description when in motion,” by a “break or breaks to be applied by the motive power.”

This invention is set forth in a somewhat vague manner. The patentees claim as one part of their invention “the application of breaks to any description of carriage or wheeled vehicle, to be applied at any angle, from a vertical to an horizontal inclusive, or from ninety degrees to forty-five degrees, including any angle;” “and the same to be applied by and taken off the wheels by the motive power at the pleasure of the person in charge of the carriage, vehicle, or motive power; or, if necessary, to apply a spring or springs to force off the break after they have been applied by the motive power; also a stop, which is applied at the end of the pole or shaft by the person driving or in charge, which stop can be placed by dropping a block of wood with a spring or pulley by the coachman or driver, whereby the motive power can back the carriage without the break or breaks acting or applying to the wheel or wheels, or in some cases a pin, or bolt, or clamp can be used by the person in charge of the motive power.”

They also claim to be “the first inventors to hang breaks on a circle,” so that they can be regulated by a thumbscrew, “and made forty inches in length if necessary, and such break or breaks to be applied to any description of carriage or vehicle by the horse or horses, or any other motive power, and to be disconnected by the horse or horses or any other motive power, or with a spiral spring or any other description of spring or springs to be connected near the break or breaks or at other part of the rod or rods connected with the break or breaks leading to and from the motive power; and when necessary to keep the breaks to their work or assist the motive power in the application of the break, the same can be done by the coachman or any other person in charge by a small chain” connected to any of the rods mentioned above, “and connected with a treadle or lever which will be placed near the man’s foot.”

When the break or breaks is or are to be applied to railway carriages or vehicles, the patentees cause “the steam engine or any other motive power to apply the break or breaks by the use

" of steam or air, or hydraulics, or electricity passed through a " tube or tubes, pipe or pipes, syphon or syphons " of any size that may be necessary, each carriage, if desirable, of a train of carriages being provided with a tube or syphon, and such tubes or syphons being suitably connected by sliding and other joints, and forming a communication with cylinders in which rams or pistons are placed, and connected by rods with suitable breaks, and which rams or pistons may be acted upon so as to apply such breaks to the wheels by air, steam, water, or electricity, which is to be forced through the tubes or syphons, the breaks, when the rams or pistons cease to be acted upon by the air, steam, water, or electricity, either falling from the wheels by their own gravity or being forced back by springs.

The invention also includes the application of "extra buffers to " the ends of railway carriages as a prevention against their " tumbling over each other when suddenly checked." Either one or two of these extra buffers may be applied to each carriage, an arrangement being described in which it is apparently meant that one buffer shall project in front of the middle of the top of the carriage, and be connected to diagonal bars passing from the corners, the whole being "carried by a spring along the top of " the carriage, the buffer being in the centre of the spring or " springs longitudinally or transversely."

One arrangement is shown in the drawing annexed to the Specification in which pipes arranged beneath a railway carriage are apparently meant to convey steam, water, or condensed air to cylinders containing pistons or rams, to the rods of which other rods are jointed, and the latter also jointed to other rods by which the breaks can be moved to and fro, the first mentioned rods forming an angle with each other when the breaks are not in contact with the wheels, but being thrust into a straight line when the breaks are applied. No intimation is given, however, of any mode of causing "electricity " to pass through the tubes.

The patentees further include in their claims the covering of the tubes or syphons with an oily or greasy substance, and this with leather or some other substance which will prevent such oily or greasy substance from leaving the tubes or syphons, the object of this being to prevent frost from interfering with the free passage of water or other matter when introduced into such tubes or syphons.

[Printed, &c. Drawing.]

A.D. 1857, October 8.—N° 2573.

ALLEN, Jon, and YOUNG, JOHN.—(*Provisional protection only.*)—"Improvements in preventing oscillation in carriages upon railways."

This invention consists essentially in "forming and fitting the face plates of buffers for railway carriages in such manner that when the plates on the ends of the buffers of adjacent carriages are brought together the lateral motion of one past the other may be prevented, while at the same time no obstruction shall be offered to the motion of a train composed of carriages thus fitted round curves."

The invention may be carried out in various ways. Thus, the plate on one buffer may be formed with a spherical or other projection, and the plate on the buffer which comes opposite to it with a spherical or other recess, into which the aforesaid projection will take when the two buffers are brought together." Or, "each of the plates may be formed with a spherical or other recess, and a sphere, or cylinder, or other body be suspended from or attached to the buffer in such manner that when the said sphere, cylinder, or other body is suitably placed, it may, on the buffers coming together, be partly in the recess of each plate, or any other equivalent arrangement may be adopted," such as will allow the buffer plates to incline themselves to each other in passing round curves.

[Printed, 4d. No Drawings.]

A.D. 1857, October 8.—N° 2577.

CRAIG, WILLIAM GRINDLEY.—"Improvements in the manufacture of railway carriage and other wheels formed of cast metal, or having cast-metal naves or bosses."

The object of this invention is to cast the naves or bosses of railway carriage and other wheels composed of cast metal with the holes or openings therein for the reception of the axles "so accurate and true as to dispense with the boring and key-bed cutting" which is necessary when such naves or bosses are cast in the ordinary manner.

One mode of carrying out the invention is described which is specially adapted "to the construction of railway carriage wheels having wrought iron spokes or arms in cast metal naves or bosses." A moulding bed is used which is provided with horns



projecting upwards, these being turned on the outside, and a recess being formed in the upper inner edge of each, which fits a corresponding projection on the moulding box, the latter being thus retained in its proper position when placed upon the bed, and the pattern for the nave or boss is furnished with points which lie between the horns, and are formed with projections which partly embrace the outer portions thereof, and keep the pattern in its place, these points, moreover, forming the spaces in the sand for the reception of the spokes upon which the nave is to be cast. At the bottom of the pattern is a pin or pivot of metal, and the arrangement of the parts is such that after the sand has been rammed around the pattern and the latter removed, this pin is left in the mould bed, and forms a "centre" to receive one end of the core which is to produce the opening or hole in the casting. The core may be formed in a core box, and composed of sand, a central tube being used around which the sand is rammed, the tube being held in position by certain projections and clutches, or it may be formed of loam around a tube furnished with flanges and mounted between the headstocks of a lathe. Or instead of a core formed by either of these methods a "chill mandril" may be used, which must be hollowed at the ends, the core in all cases being held in its proper position in the mould while the nave or boss is being cast by one end of the core being placed upon the pin already mentioned, the other end of the core being passed through an opening in the centre of the moulding box. The spokes are kept in position, when laid in order for the nave to be cast upon them, by a projection or rim outside the mandril bed, and by the horns already mentioned.

[Printed, 10d. Drawing.]

A.D. 1857, October 13.—N° 2618.

MARTIN, MELITON.—"Improved apparatus for retarding and stopping railway carriages."

This invention consists "of an hydraulic apparatus whereby a break may be brought to act on the running wheels of ordinary carriages, which will be thereby retarded or stopped altogether."

The apparatus "may be described as consisting of a cylinder which communicates with a tank containing water, by means of one or more tubes fixed on to the cylinder covers; a piston is

R. C.

x x



" made to work from end to end within the cylinder by the pres-  
 " sure produced by a column of water upon the surface of the  
 " piston, and which pressure will be greater and greater according  
 " to the opening of the tubes communicating with the tank.  
 " The entrance of the water into the cylinder, and the velocity of  
 " the piston is governed by cocks on the connecting pipes. Now,  
 " by connecting the piston rod with an excentric placed on the  
 " axle of a railway carriage it is evident that by slowly shutting  
 " all communication with the water tank the carriage wheel will  
 " cease to turn, and the carriage will thereby be stopped. It is  
 " also evident that if this break be applied to a railway carriage  
 " on an inclined plane, the outlet of the water from the cylinder  
 " to the tank can be so regulated that the carriage will descend  
 " with a constant and not with an accelerated velocity. In order  
 " to obtain the complete working of the hydraulic break the  
 " inlet of the water into the cylinder should be as free as pos-  
 " sible, whilst the outlet should be so disposed that it could be  
 " regulated to any required opening. This can be obtained in  
 " two ways, either by using two tubes and two valves, or only  
 " one tube and one valve at each end of the cylinder. In the  
 " first case, one of the two valves would open entirely the inlet,  
 " and shut altogether the outlet of the water, as in a common  
 " pump valve, whilst the other would be regulated so as to allow  
 " only a determined quantity of water to pass into the tank,  
 " thereby increasing or diminishing the resistance upon the  
 " piston."

" In the second case, if only one valve be used, it may be con-  
 " structed with a conical regulating valve."

The details of the invention are very fully described.

[Printed, 10d. Drawing.]

A.D. 1857, October 16,—N<sup>o</sup> 2652.

ARBEL, LUCIEN.—"Certain improvements in manufacturing wheels for carriages on railways."

This invention consists in manufacturing wheels for railway  
 carriages by forging or otherwise forming the nave, the spokes,  
 and the felloes separately, bringing them together or setting them  
 up in a suitable frame, then heating and welding the whole  
 together, with any necessary appendages thereto, such as an  
 eccentric crank or other such part, in dies under a steam or other

hammer or press. A steel or other tyre may simultaneously be welded upon the wheel if required, and in order that the whole of the parts may be brought to an uniform heat, or nearly so, previous to the welding, the nave may be formed in two or more parts. The mortices or recesses for the spokes are formed in the nave (or in the parts of the nave) when at a white heat, by means of the hammer and a suitable tool, which the hammer drives into the nave and into corresponding recesses made in a die containing the nave. This die is reversed when the operation is completed, and the nave driven out of it by bolts which pass through holes in the bottom. The dies in which the parts are finally welded together are furnished with guides which prevent the one moving or riding upon the other when under the action of the hammer, and mortices or recesses are made by a morticing machine in the felloe to receive tongues in which the outer ends of the spokes are made to terminate.

Different modifications of the invention are described, some of these being more especially applicable in the construction of carriage wheels, while others relate more particularly to the wheels of engines.

[Printed, 10d. Drawings.]

A.D. 1857, October 17.—No 2660.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from P. J. Gayet.*)—"Improvements in forming the joints of pipes for conveying water, gas, and other fluids."

According to one modification of this invention "one of the pipes which is to be connected is formed with an enlarged end, terminated by a recessed flange, into the recess of which a ring of vulcanized india-rubber is placed, and against this ring a circular plate is tightly screwed to the flange. The second of the two pipes to be connected is then forced through the ring, which is of such an internal diameter as to admit the said pipe and grasp it tightly, forming with it a fluid-tight joint. If the two pipes thus connected are to be subjected to longitudinal action only, the circular plate may be plain, but if they are to be subjected to transverse strains, this plate may be formed with a funnel-shaped flange, spreading outward from the packing ring."

In another arrangement the enlarged end of one of the pipes may be dispensed with, and a boxed flange formed on the pipe.

into the recess of which flange a ring of vulcanized india-rubber is forced, being held by the boxed sides of the recess. The end of the second of the two pipes to be connected has a small circular shoulder screwed upon it, and a loose circular plate, which comes against this shoulder, is placed around it. Between this plate and the flange of the first pipe a ring of india-rubber with convex sides is placed, and the plate and flange are then screwed tightly together. If the hole in the loose plate is made to taper, the two pipes, which are connected as before described, will be capable of moving more or less at an angle to each other, without opening the joint. The hole in the plate may be made cylindrical if this provision is unnecessary.

Among the purposes to which this invention is applicable, the patentee mentions "joining the pipes used for conveying steam along railway trains for working breaks or signals," an arrangement for which is described which partakes of the essential features of both of the modifications mentioned above.

[Printed, 8d. Drawing.]

A.D. 1857, October 19.—N<sup>o</sup> 2664.

DE CRISTOFORIS, LUIGI.—"An improvement on the system of vehicle wheels, to be called the De Cristoforis conical wheels."

According to this invention each of the wheels of a vehicle has an axle which is placed "obliquely to the plane of the ground," the bearings of the axles being so contrived that each "is supported on both sides of each wheel," the spokes of each wheel, moreover, lying "obliquely to the axis, so as to form with the rim a conical wheel."

The Specification of the invention is very short, the patentee claiming, in particular, "the construction and arrangements of wheels of a conical form, and inclined to the plane of the ground at an angle whatever, so as to be enabled to use wheels of larger dimension than the usual with proportionally less height."

[Printed, 6d. Drawing.]

A.D. 1857, October 19.—N<sup>o</sup> 2666.

SCHMIDT, JEAN.—"An improved method of making tyres for railway wheels."

This invention consists in hardening the tyres of railway wheels by means of certain chemical ingredients, a special construction of furnace being described as being used in performing the operation, which, however, may be effected in an ordinary furnace.

The furnace described consists of a fire-place communicating by means of suitable flues and passages with two chambers or "boxes" composed of brickwork, each box forming an upright hollow cylinder, and having within it a large cylindrical tube of iron, this tube being of somewhat less diameter than the interior of the tyres to be treated, which are placed around it, piled one upon another, being arranged in pairs, with the flanges of each pair together. Twelve tyres may thus be placed in each box, and this being done sand is first poured into the spaces between the inner surfaces of the tyres and the outer surfaces of the cylinders around which they are placed, and the spaces between the outer surfaces of the tyres and the inner surfaces of the brickwork boxes are then fitted with a composition consisting of the following ingredients:—Powdered charcoal, about 250 lbs.; grease, 10 lbs.; greaves, 60 lbs.; hoof parings, 60 lbs.; ox foot, 60 lbs.; tartar, 35 lbs.; coarse sugar, 10 lbs.; saltpetre, 6 lbs.; and rosin, 10 lbs. The boxes are then closed at the top and the fire lighted in the furnace, the heat from which so acts upon the composition as to cause it to produce the hardening effect upon the tyres which is desired, the operation being continued for from eight to ten days, as may be requisite. If preferred, the apparatus may be formed with one box only. Certain "probes," mounted in square tubes of fire brick, are so arranged as to be withdrawn from the brickwork from time to time in order to examine the state of the tyres, and a "well" is arranged below each box, which is closed by a cover while the work is proceeding, but is opened at the end of the operation, when the tyres have been removed, for the purpose of removing the sand, &c. which has been used; galleries communicating with the wells through which such removal is effected.

Bars of iron may be treated as described above in a furnace of suitable shape.

[Printed, 10d. Drawing.]

A.D. 1857, October 27.—No 2718.

CLARKE, WILLIAM.—"Improved means of connecting and working breaks for railway carriages."

*The object of this invention is so to connect and work the*

breaks of railway carriages "that all the breaks may be brought "into action simultaneously," and a "perfect compensation" be provided for "the varying distances of the buffer springs." "This object is effected by connecting the break apparatus of "contiguous carriages by means of cords, chains, or other analogous flexible connections, instead of by rigid rods" as usually practised. "By causing these chains or cords to pass round "suitably arranged pulleys and attaching one end of such chain "to an adjustable rod the distance between the carriages may vary "constantly, without in any way affecting the working of the "breaks, as when any slack occurs in the chain from the carriages being brought up close so as to collapse the buffer springs, such slack in the chain will be taken up by the adjusting rod, to which one end of the cord or chain is attached. "The break blocks are attached to the ends of horizontal bars, "which are jointed to vibrating levers, whereby they are worked. "These levers are actuated by connecting rods and levers worked "by the guard in the way usually adopted, but in order to work "the breaks of the next carriage a pulley is mounted in some "convenient part of one of the connecting rods, and round this "pulley passes the connecting chain or cord, which is secured at "this end to some fixed part of the framing. After passing "round the pulley belonging to the first carriage, the chain or "cord is conducted round a similar pulley connected with the "break apparatus of the second carriage, and from thence it "passes round a third pulley in fixed bearings attached to the "framing of the carriage, and the end of the chain is, as before "mentioned, attached to one end of an adjustable rod, which is "jointed at the other end to the fixed framing of the first carriage, while its former end works through a socket fixed to the "framing of the second carriage. If the end of this rod and the "beginning of the chain are permanently fixed to the first carriage, both the rod and chain must be provided with a connection "that will admit of being disconnected with facility when it is "required to detach the carriages one from another."

By these arrangements "the guard can only put on the breaks," and therefore weighted levers or springs are provided for the purpose of removing the break blocks from the wheels when they are no longer desired to act. The details of the invention may be variously modified, as, for instance, instead of chains, "rods may "be used, except at the parts working on the pulleys."

[Printed, &c. Drawing.]



A.D. 1857, October 27.—N<sup>o</sup> 2721.

NEWALL, JAMES. — "Improvements in railway breaks and " signals, and in the machinery or apparatus for working the " same."

This invention relates in the first place to further improvements in the self-acting breaks for railway and other carriages for which patents were granted to the present patentee on the 3rd of December, 1852, No. 939, and on the 16th of January, 1854, No. 98, and consists in causing the breaks to be put into action by means of inclined blocks or wedges placed between the rails on such parts of the line as may seem desirable, "some of the said blocks being " in certain defined and permanent positions, governed by the " signalman or other duly authorised person, and others portable, " so that platelayers or operatives can place them in any desired " position so as to stop the train when danger requires it." As in the previous inventions the breaks of the trains are brought into action by weights or springs, which come into operation upon the releasing of catches from ratchet wheels, and in this invention, by the use of bars or rods connected to the carriages and furnished with blank wheels or pulleys, the catches are liberated whenever such blank wheels or pulleys come into contact with the blocks or wedges on the line, the apparatus being moreover so contrived that a gong or bell will be sounded thereby when the catches are liberated, warning being thus given thereof to the guard of the train. And a bar and blank wheel or pulley may also be carried by the engine of a train and made to open the whistle of the engine on coming into contact with a block or wedge.

Another part of the invention consists in so arranging rods, wires, or other suitable apparatus as to give the passengers in any carriage the power of liberating the catches and so putting on the breaks, at the same time giving a signal to the guard that something is wrong; similar apparatus enabling the guard to communicate with the engine driver by striking a bell or sounding a whistle.

Another part of the invention relates to compensating for the wear of the break blocks, certain arrangements of rods having thereon right and left hand screws combined with a pipe nut, toothed segments and screws, and quadrants combined with screwed rods and pipe nuts being used in carrying out this part of the invention.



Another improvement consists in forming shoulders or abutments at the intermediate joints on the bars or plates to which the break blocks are attached, "for the purpose of preventing the rising of the blocks by friction when they are brought into contact with the face or periphery of the wheel."

Another part of the invention consists in various arrangements of the mechanism which actuates and governs the patented breaks of the inventor, or other breaks, "so that a carriage may be placed in a train with either end in front facing the carriage before it, which can be coupled up and the break blocks made to act on both wheels at the same time;" certain bevil gearing, screws, slides, rods, bell cranks and handles being used in effecting these objects. Extra break blocks working alternately, without reversing gear, are, however, in some cases used.

The invention also includes a mode of employing the longitudinal shafts which are mounted beneath the carriages for the purpose of working the breaks so that they serve as draw bars also, having combined with them, in relation to this object, springs, which may be either laminated or spiral.

Another part of the invention relates to fog signals, and will be noticed in another series of abridgments.

The details of this invention are set forth at considerable length, and will not be clearly understood without the aid of the drawings annexed to the Specification.

[Printed, 1s. 10d. Drawings.]

A.D. 1857, November 11.—No 2851.

WILLIAMS, JOSHUA.—"An improvement in coupling and connecting carriages on railways."

This invention is intended to prevent accidents arising from the breaking of the connecting apparatus employed between the draw hooks or chains, or of the latter themselves, or of the draw bar, or the derangement of any of the parts connected therewith; and the invention consists "in the employment of two supplementary draw bars or equivalents thereto (in addition to each ordinary draw bar), to be connected, by preference, to the same draw spring as is employed with the regular draw bar; but a separate spring or springs may be used, if desired, in connexion with the supplementary bars." The patentee employs side couplings or *safety chains* in connection with the supplementary bars, "and in

" these chains less slack should be allowed than is customary in the safety chains as ordinarily employed."

Different modifications of the invention are described, the " essential principle " of the invention being the connection of the chains of the supplementary bars with the existing draw spring or with other suitable springs in such manner that in the event of the centre coupling apparatus giving way " the shock or strain shall immediately come back upon the same spring or upon the spring or springs which may be specially provided in connection with the chains and supplementary bars," the carriage being thus relieved from the shock, and this arrangement keeping the train entire.

[Printed, 16d. Drawing.]

A.D. 1857, November 14.—N° 2867.

NEWTON, ALFRED VINCENT. — (*A communication.*) — " Improvements in apparatus for retarding and stopping the progress of railway trains."

This invention relates " to that class of railway brake apparatus in which all the brakes of a train are connected together and made to act simultaneously upon their respective wheels," and the main object of the invention " is to overcome the slack occasioned by the play between the carriages, and to keep the connecting chain or rod between the engine and the hindmost carriage always tight or at a uniform tension."

The brakes are to be operated by means of a steam piston and cylinder attached to the engine, which acts against the " brake stem " of the carriage next the engine, this " brake stem " acting through the medium of chains and rods upon the " brake stem " of the next carriage, and so on in succession throughout the train, there being combined with this apparatus certain levers which act in connection with the buffer rods of the carriages, this latter part of the arrangement serving to keep the chains and rods passing between the various carriages at an uniform degree of tension, although the distance between one carriage and another may vary; or a system of " toggles " may be used instead of the levers.

The details of the invention are very clearly set forth, the invention being applicable to different systems of brakes.

[Printed, 8d. Drawing.]

A.D. 1857, November 17.—N° 2883.

SMITH, SOLOMON P. — "Constructing iron wheels for railway carriages and similar purposes."

According to this invention a wheel is formed, in the first place, with a rim, the tread and flanch of which are of the ordinary character, but which has within it a rib, on the inner edges of which a head may, if desirable, be formed. Such a rim may be easily cast, and have the exterior chilled by the use of suitable apparatus. The "hub" or nave of the wheel is cast in one piece with a plate which serves to support one side of the rim when the whole of the parts composing the wheel are put together. This plate may be either "dished" or straight or of any other form deemed suitable; but it has on its circumference a flanch or collar which extends under and supports the rim on one side of the rib mentioned above, there being at one side of this flanch or collar an outer flanch or collar, which partially embraces the rim. Between the rim and collar or flanch is placed some substance "that will not transmit the vibrations from the rim to the centre" of the wheel, this substance being confined by a "packing ring." A second plate, of similar character to that already mentioned, but having an opening in its centre to embrace the hub or nave, is then combined with the parts named above, bolts passing through the two plates and securing them together.

The details of the invention are minutely described, certain bolts, washers, and packing, in addition to the packing and bolts mentioned above, being used in carrying out the invention.

[Printed, 8d. Drawing.]

A.D. 1857, November 19.—N° 2904.

CLAY, WILLIAM.—"Improvements in metal knees employed in the construction of ships, buildings, railway or other waggons or carriages, or other analogous purposes."

In this invention the patentee takes a bloom, ingot, or bar of steel, and rolls it down into a taper or other form, such as is required for metal knees for ships, buildings, railway and other waggons or carriages, by means of the rolling mill and apparatus described in the Specification of the Patent granted to him on the 16th of December, 1848. Other mechanical arrangements may, however, be used for the purpose, and knees of metal may

thus be produced which will be "much lighter than when iron is employed, as heretofore."

A modification of the invention consists in making the knees from "a compound bar composed partly of steel and partly of iron," the steel part being by preference arranged so as to form that part of the knee "which is subject to compression when the knee is strained," the iron being at that part which will be subjected to a tensile strain. "The material known as homogeneous metal, or a mixture of iron and steel, made into an ingot and rolled down to the required form, may also be employed for making knees," which will be found to be superior to the ordinary iron knees.

[Printed, 4d. No Drawings.]

A.D. 1857, December 4.—N<sup>o</sup> 3010.

D'HELLE, JULIEN, and DE WARESQUIEL, ALBERT, Viscount.—"Improvements in railway rolling stock."

This invention relates, in the first place, to the construction of the frames of carriages or trucks intended for use on railways or tramways, and consists essentially in providing such carriages or trucks "with a species of turntable, so as to make the body of the carriage moveable in the horizontal direction over the frame or under part of the carriage round a vertical spindle, over which latter, in some instances, and more particularly for the class of waggons employed for carrying earth or ballast, the said body may be caused to turn also in the vertical direction, so as to allow the tilting of the body of the waggon," this being provided for by the application above the turntable of a horizontal shaft or axis on which the body of the carriage or truck rests.

Another part of the invention relates to the axles of the wheels of carriages and trucks, and consists in providing each wheel with a separate short axle, mounted in suitable axle boxes, the framing of the carriage or truck being so arranged as to furnish proper supports for such boxes.

[Printed, 10d. Drawings.]

A.D. 1857, December 15.—N<sup>o</sup> 3080.

TURNER, EDWIN, and PEARCE, JOHN CHARLES.—"Improvements in the manufacture of railway wheels."

This invention relates to uniting the tyres and bodies of railway wheels firmly together, "so that their strength will be effectively combined and the danger of fracture greatly diminished." The patentees form "dovetailed or other suitably shaped grooves or cavities in the inner surfaces of the tyres and also in the outer surfaces of the wheel bodies or rims, so that when the tyres are placed or shrunk upon the wheels the grooves or cavities in the former will correspond with those in the latter. The grooves or cavities thus formed in the adjoining surfaces of the tyres and wheel rims are filled with fusible metal, alloy, or other suitable material (by preference, cast iron or zinc), which is poured in through suitable holes or channels formed in any convenient parts of the wheel rims or in the joints of the tyres and rims, or at the angles formed by the junctions of the spokes. The metal or material thus poured or cast into the grooves or cavities forms continuous double dovetailed or other shaped connections, extending all around or partially around the wheels, as may be desired, whereby the tyres and rims are locked firmly together."

The patentees state that they prefer "the dovetailed grooves or cavities of the tyres and wheel rims being formed at the iron manufactory during the process of rolling," and that for this purpose they "construct the rolls employed in finishing such tyre, rim, or spoke bars with ribs, grooves, and projections suitable for the purpose," and that when the wheels are of cast iron they prefer "casting the groove or cavities in the rims at once," but that where the grooves or cavities are not already formed in the material of which the tyres and rims are composed they form them by turning or otherwise.

The invention also includes the use of "transverse keys or fastenings, either cast or driven into suitable grooves formed across the adjoining surfaces of the tyres and rims," in order to prevent the separation of the ends of the tyres in cases of fracture or failing of the welding; as likewise the construction of railway wheels "with intermediate parts cast between the tyres and rims, whereby both are firmly bound together and the necessity of accurately fitting the tyres and wheels to each other is dispensed with."

[Printed, 8d. Drawing.]

A.D. 1857, December 21.—N° 3134.

TATLOW, JAMES, and HODGKINSON, HENRY. — “Improvements in railway breaks, and in apparatuses for connecting shafts or rods for working breaks and signals.”

In one part of this invention there is placed below the body of a railway engine or carriage a longitudinal shaft, to which rotation may be given at any time by means of a handle and suitable gearing provided for the purpose, a worm upon this shaft being thus made to turn a worm wheel with which it is in gear, and also a shaft upon which such wheel is fixed, there being also upon this shaft spur wheels which are in gear with vertical racks formed in the upper parts of bars which are capable of being raised or lowered in suitable bearings, there being at the lower ends of each bar a shoe or skid, which on the depression of the bar is pressed down upon the rail. The shoe or skid may have either a plain or a toothed flange sole, and provision may be made if desirable for passing sand or grit through the skid when in action. Instead of the worm and worm wheel mentioned above, a screw and nut, or other equivalent contrivance may be used.

In another part of the invention shoes or skids are so arranged in the front part of the framing of an engine that the driver may at any time by turning a handle force them down upon the rails, by which means in case of the engine suffering a collision it will be prevented from being driven back upon the carriages of the train, the skids being roughened or serrated on their lower surfaces, in order to increase their hold upon the rails.

The longitudinal shafts of the different carriages, when the first arrangement is used, are connected by means of sliding pieces which enter openings in a central piece made to receive them, the sliding pieces and the openings being of rectangular section, and the rotation of one shaft being thus communicated to the others; certain stops and springs controlling the movements of the sliding pieces, and certain sockets and spring hooks being employed to facilitate the coupling and uncoupling of the carriages with and from each other, and universal joints serving to permit the turning of the apparatus round curves in the rails. Such apparatus may be used in the working of signals as well as of breaks.

[Printed, 8d. Drawing.]



A.D. 1857, December 22.—N° 3140.

RODGETT, SAMUEL, and RODGETT, DANIEL. — "An improved method of coupling and uncoupling railway, tramway, and other carriages, waggons, lorries, trucks, and other vehicles."

This invention is intended to provide means of coupling and uncoupling railway vehicles without it being necessary for a person to go between them. The end of each carriage is provided with a catch or hook, connected thereto by a draw bar, and to the "neck" of each bar a coupling link is attached, the link from one of the bars being passed upon the hook or catch of the other at pleasure, one only of these links being in use at one time. The links are connected to the catches or hooks by means of shafts or rods which pass through eyes formed in bolts mounted so as to be capable of sliding in sockets let into the front beams of the carriage, and certain handles, screws, wheels, and springs are employed to facilitate the application to and disconnection from the hooks or catches of the coupling links. The details of the invention may be varied.

[Printed, Ls. Drawing.]

A.D. 1857, December 23.—N° 3151.

MOSS, JOSHUA, GAMBLE, THOMAS, and GAMBLE, JOSEPH. — "An improvement in the manufacture of cast steel hoops and cylinders."

The object of this invention is to produce hoops or cylinders of steel, solid throughout, and without joint or weld, to be afterwards rolled into tyres for railway and other wheels, or employed for other purposes; and the invention consists "in pouring the metal into a suitable mould, placed vertically, through two mouths or conduits at the upper part and near the two top sides of the mould or mould casing. These conduits or mouths rise sufficiently high from the periphery or outer edge of the annular space into which the metal is to be run to receive the whole of the honeycomb or top surface of the metal, consequently the annular space in the mould is entirely filled with solid metal, without any hollow or honeycomb surface. The whole of this surface is received in the two mouths or conduits, and being cut off from the hoops or cylinder after being removed from

" the mould there remains a solid cast steel ingot in the form of, " a hoop or cylinder."

The avoiding of the "honeycombed surface" to hoops of steel appears to be considered an important feature of the invention.

[Printed, 4d. No Drawings.]

A.D. 1857, December 23.—N° 3153.

NORTON, CHARLES.—(*Provisional protection only.*)—"Carriage door shields to prevent accidents arising from the shutting of railway or other carriage doors, also applicable for nursery doors or any other doors where children may have access, or where safety from accident may be an object."

This invention consists in attaching a curved piece of metal to the inside of the "hinge stile" of the door, this curved piece moving, when the door is opened or closed, in a curved groove in the hinge post, another curved piece being connected to the framing of the carriage "to protect and overlap the piece attached to the door when the same is open." If desired, the curved groove can be continued to the outside of the carriage, and different modes adopted of securing the parts together.

The invention is described by reference to a drawing, but with relation to carriage doors only.

[Printed, 8d. Drawing.]

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1858.

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A.D. 1858, January 1.—N° 2.

MURPHY, JAMES.—"Improvements in wheels used on railways."

The first part of this invention consists "in causing the inner periphery of the tyre to dovetail or fit into the outer periphery of the skeleton;" the second part of the invention consisting in so rolling bars of iron "that each bar may form ribs of the shape and angles required for insertion into the dovetails of the tyre."

A wheel is described in which angular or dovetail grooves are formed in the inner edges of the tyre, the rim or felloe of the

wheel having projections on the outer edges, which, when the tyre has been placed upon such rim or felloe, are forced into the grooves by hammering or rolling, or any other suitable means; the tyre being thus "rigidly secured" upon such rim or felloe. The details of the invention may, however, be modified according to circumstances.

[Printed, 6d. Drawing.]

A.D. 1858, January 5.—N° 15.

TWIGG, JOHN NORTH WILKINS, and ADKINS, WILLIAM.—*(Provisional protection only.)*—"Certain improvements in self-acting railway brakes."

This invention consists in connecting the buffer rods of railway carriages "to strong spring or other levers, secured by strong bolts or pins to the frame of such carriages," such bolts or pins forming the fulcrums of the levers. To the lower ends of these levers the brakes are attached, and by this arrangement the brakes are removed from the wheels "when draughtway is on the carriage or carriages to which they are attached, but the moment the power by which the traction is effected (whether by a locomotive engine or other agency) stops or slackens its speed, the carriages are from their momentum pressed together, and as the buffers come or are pressed in contact," the brakes act upon the wheels "with more or less force, and arrest their further progress." In order to provide for the backing of a train of carriages, certain connecting rods and simple or compound levers are so arranged as to be brought to act when necessary upon the buffers in such manner as to prevent them from acting on the brakes during such backing, the levers being placed on the sides of the carriages "so that they can be easily operated upon, and, being all connected, the mere act of stopping or bolting out one buffer secures the whole in each carriage."

[Printed, 4d. No Drawings.]

A.D. 1858, January 7.—N° 27.

REILLY, JAMES, the younger.—"Improvements in chairs and seats of various descriptions."

This invention consists essentially in attaching the body or frame of a chair or other seat to a cylinder or hollow guide, the interior of which is furnished with "a rod or piston having a spring or

" springs in connection with it, so arranged as to give elasticity to the seat," and "affording at the same time the means of giving a swivel or rotary motion;" this being effected by placing the cylinder or guide upon "a ball or universal joint."

The arrangement may be varied by attaching the piston, instead of the cylinder, to the body or frame of the seat; and such a seat may be furnished with ordinary legs or otherwise, and may be provided with rockers, or have the lower parts of the framing "made partly spherical," so as to admit of "see-saw or other amusing movements."

These arrangements are set forth as being applicable to the seats of railway and also other carriages, as likewise to chairs and seats in general, rocking horses, perambulators, and other articles.

[Printed, 6d. Drawing.]

A.D. 1858, January 9.—N° 42.

CHAUFOUR, JULES ALPHONSE MATHIEU.—"Certain improvements in the construction of axle boxes and axle bearings."

This invention relates to axle boxes and bearings, or plummer blocks "containing cylinders for lessening the friction of the axles of railway and other carriages," and of shafts, of screws, and machinery in general.

The details of the invention will be sufficiently understood from the following abstract of the Final Specification:—

"This system of constructing axle boxes and plummer blocks with cylinders for transforming, in part, a sliding friction to a rolling friction, is composed, first, of a cast-iron axle box, in which is placed a shell or bearing of a cylindrical and octagonal form. This shell supports another shell which receives the cylinders."

"Secondly, of two collars which support the journal at its two extremities. The collars keep the cylinders in their proper position, and form a basin or reservoir for the oil for lubricating the cylinders, the journal, and the friction collars."

"Thirdly, of a cup or vessel placed at the end of the shell for receiving the oil which escapes from the basin or reservoir on one side only of railway axle boxes."

"Fourthly, of a feeding cup or reservoir placed on the upper part of the axle box," by which the patentee introduces "the

" oil for lubricating the cylinders and journal, which oil is introduced by a tube."

" Fifthly, of a lower basin or vessel, intended to indicate the level of the oil in the reservoir, and receive the waste oil."

" Sixthly, of a basin for receiving the oil which escapes from the back of the axle box."

" Seventhly, of iron or steel cylinders, according to the nature of the materials of which the journals and shells of the boxes are composed."

" Eighthly, of packing rings or washers, composed of iron, copper, or other metal. These packing rings support the pivots of the cylinders, and allow the necessary tightening for rendering them applicable to all journals furnished with lateral collars. These rings also preserve a small space between the cylinders, to prevent friction, which would cause them to work irregularly."

Ninthly, if necessary, "rings or washers in a single piece" may be employed "for journals which have no collars. The orifices which are formed in the packing rings should be of an oval form for obtaining the necessary tightening."

"Tenthly, to avoid the rapid wear which would take place on the cylinders, journals, and the shell, in consequence of great weight and concussion," the patentee gives to the friction collars "the dimensions calculated according to the weight and speed."

[Printed, 10*l*. Drawing.]

A.D. 1858, January 19.—No 90.

JOHNSON, JOHN HENRY.—(*A communication from Isaac P. Wendell and Jacob L. Wendell.*)—(*Provisional protection only.*)—

"Improvements in the boxes and journals of carriage wheels and axles, and in journals and bearings generally."

This invention relates to the boxes and axles of carriages for common roads, as well as those of carriages for railways, and may also be so modified as to be applicable to journals and bearings generally, "whereby, in the case of carriage wheels, greater facility is afforded for removing and replacing the wheels," the lubricating chambers and material being in all cases "protected from the accidental admission therein of dust, grits, or other extraneous substances, whilst at the same time a more complete lubrication of the journal is effected."

With regard to the boxes and axle journals of ordinary common road and other vehicles where the wheels run loosely upon their axles, "it is proposed to construct the box which is driven into the hub of the wheel in the usual manner, in two parts, namely, an outer and an inner portion, which are so arranged that a collar formed on or about the middle of the axle journal, shall be retained between these parts and in the interior of the box, and kept in constant contact with the lubricating material, which is contained in suitable chambers in the two portions of the box."

After describing certain details connected with the arrangements mentioned above, the inventors mention that in constructing the journals and bearings of railway carriages and ordinary shafting, "it is also proposed to employ one or more intermediate collars, formed on the journal itself, such collars working in corresponding recesses or lubricating chambers made in the upper and under halves of the brasses or bearings, so that the collar or collars which revolve in contact with the oil may during their revolution, take up constantly a certain amount of oil, and distribute it equally over the whole of the rubbing surfaces."

He also mentions that in the case of railway axles, "a slight longitudinal play may be allowed for, by making the upper recess or recesses in which the collar or collars work rather wider than such collars," but that for "ordinary pillow blocks these recesses may be made to fit the collar accurately, so that the latter may receive the end strain." He also states that in shafts "subjected to a great end thrust, the ordinary outside or end collar may be used in conjunction with one or more intermediate lubricating collars, but that in all cases these intermediate collars work in direct contact with the oil, and in corresponding chambers or recesses in the upper and under portions of the bearing." He further states that in order to keep the oil chambers constantly supplied with oil, it is proposed to form oil reservoirs on one or both sides of the pillow block, such reservoirs communicating with the chambers in the bearing, and returning any oil which may drop therefrom "to the interior of the pillow block."

[Printed, 4d. No Drawings.]



A.D. 1858, January 20.—N<sup>o</sup> 99.

DYSON, JOHN, SHIRT, EDWIN WILKINSON, and SHIRT, HENRY. — (*Provisional protection only.*) — "An improved construction of spring for resisting sudden and continuous pressure."

This invention consists "in the combination of plates of steel to moderate and neutralize the effect of concussion or pressure." The inventors employ a box or receiver, "in which are fitted a series of segmental and straight plates, hardened and tempered. They are placed alternately, with the extremities of two curved plates bearing against an intermediate straight plate, and the convex surface of the outer curved plate in contact with the convex surface of another," the next of the series consisting of "two curved plates, with an intermediate straight or chord plate, against which the extremities bear." The thickness of the plates diminishes "from the framework or point of ultimate resistance to the outer plate of the series or point where the pressure is first applied, the outer plates yielding with comparatively little pressure. The plates employed may be elongated, square, or polygonal, presenting two or more points of contact at the extremities."

The invention may be applied to buffer and bearing springs, and also to other purposes, "to moderate the force of concussion or pressure."

[Printed, 4d. No Drawings.]

A.D. 1858, January 20.—N<sup>o</sup> 100.

RISHWORTH, CHARLES. — "An improved construction of spring for sustaining loads and moderating concussion."

This invention relates to "a peculiar arrangement of straining and resilient parts for the distribution and economical resolution of the forces which operate on bearing springs and buffers for railway and other carriages or waggons," the patentee stating that by this arrangement of parts "the pressure or force of concussion is prevented from acting directly upon the elastic media or springs."

One modification of the invention is described in which one row of springs or blades is used, "which springs are intended to

“ act by compression : but two or more rows of springs or one  
“ single spring, or two or more single springs placed side by  
“ side, or one within the other, may be used. The springs may  
“ also be so disposed between or connected with the blocks or  
“ parts connecting the straining links as to act by stretching or  
“ pulling instead of by compression.”

[Printed, &c. Drawing.]

A.D. 1858, January 21.—N° 109.

MURDOCH, JAMES.—(*A communication from J. H. Clement.*)  
—(*Provisional protection only.*)—“ Improvements in breaks for  
“ railway and other carriages.”

The improvements which constitute this invention “ are based  
“ upon the same principle as those described in a Patent for the  
“ same object granted to Jules Hyppolite Clément, dated 17th  
“ October, 1855, No. 2318,” in which a shoe and spring are used  
in combination with a certain stop or support, one object of the  
invention being that “ when the sliding of the wheel ceases, the  
“ reaction of the spring may impart a retrograde movement to  
“ the wheels.”

In order to understand the details of this invention, it will be  
necessary to inspect the Drawing annexed to the Specification,  
springs, connecting rods, collars, and other mechanism being  
employed in carrying out the improvements. Two shoes are  
described as acting upon each wheel, and the “ gear which  
“ governs the breaks is so arranged that all the shoes fall  
“ simultaneously.”

[Printed, &c. Drawing.]

A.D. 1858, January 21.—N° 114.

CLARK, WILLIAM.—(*A communication.*)—“ Improvements in  
“ lubricating apparatus.”

This invention relates to oil boxes for “ lubricating the axle  
“ bearings of railway trucks and other carriages, horizontal shafts,  
“ &c. This oil box contains at its lower part, 1st, an oil box,  
“ properly so called, lubricating the axle journals or bearings by  
“ the aid of a capillary pad placed in an upper reservoir or  
“ chamber; 2ndly, a lower reservoir into which the oil enters  
“ when it drops off the journal, which oil may be used again.

" It contains at its upper part an ordinary grease box, which is intended to serve as a grease box when the oil box cannot be used from any cause."

The details of the invention are minutely set forth, and include a pad furnished with cotton wicks and wool filaments, "arranged similar to a brush," and with "semi-collars" of leather; also a lower oil reservoir "into which the oil running off the journal passes to be used again;" also a semi-collar "serving to stop the oil, and to cause it to fall into the oil reservoir," and, lastly, a small reservoir in which the exterior collar constantly dips.

The grease box "may be used alone in exceptional cases."

[Printed, 10d. Drawings.]

A.D. 1858, January 28.—N° 152.

BUSSI, PETER.—(*A communication from Charles Perratone.*)—

"An improved railway carriage."

This invention "may with propriety be designated a new system of framing for all kinds of railway vehicles."

"The principle on which this framing is constructed differs essentially from that of any other railway framing now in use, inasmuch as it allows the centre of gravity of the vehicle to be lowered at pleasure, independent of the diameter of the wheels. This important object is effected by the following means:—

"1st. The vehicle is suspended from the axle boxes, instead of being supported over them, as is commonly done."

"2nd. The traction mechanism (or drawing gear) of the vehicle is placed below the pivots of the axles, and made to act on a vertical plan passing by the longitudinal axis of the vehicle."

"3rd. The wheel apparatus can be altered at pleasure, either to suit the position or diameter of the wheels of the carriage or vehicle placed upon them."

"These three leading characteristics of this system of framing combine to increase the stability of any vehicle, whatever may be the rate of speed at which it travels, and allows any train of vehicles to run freely round sharp curves."

The invention is illustrated by a number of drawings, containing a great variety of figures.

[Printed, 2s. 2d. Drawings.]

A.D. 1858, January 29.—N° 166.

WOTHERSPOON, JAMES.—“Improvements in railway brakes.”

This invention consists essentially in “the application of a spring or elastic medium for the purpose of heightening or improving the working effect of the brake blocks. The spring, which may be a metal helix or coil, is interposed between the actuating power and the actual brake blocks, and it may be variously arranged to secure the required end.”

A mode of carrying out the invention is described in which an oblong block of wood is mounted between the wheels on one side of a railway waggon, there being nailed to this block two pieces of softer wood having curved faces corresponding with the curvature of the rims of the wheels, this block being mounted upon a stud fastened to a “horse-shoe shaped carrier,” bolted to the framing of the waggon, this stud passing through the block, and also through an iron strap which is bolted thereto. To this block is also connected a lever, which projects upwards therefrom, the upper end of this lever being jointed to a long curved lever by which the brake is to be applied when necessary, and there being on the lever, attached to the block, a projecting piece, through which a small vertical spindle passes, the upper end of this spindle being jointed to the long curved lever, and there being upon the spindle a helical spring, the result of the whole arrangement being that on the depression of the long curved lever, the spindle being depressed likewise, causes a washer on the upper part thereof to compress the spring against the projecting part of the lever attached to the block, the latter being thus caused to turn slightly upon its stud or fulcrum, and so press the curved pieces carried by it against the wheels of the waggon. The spring is enclosed within a case to protect it from injury, and the long curved lever passes through a guide, and is supported by a spring when it is not necessary to apply the brakes, and is maintained in position, after being depressed in applying the brakes, by means of a rack and catch. The details of the invention may, however, be varied.

[Printed, &c. Drawing.]

A.D. 1858, February 3.—N° 195.

HOLLIS, ALFRED, and LEE, STEPHEN.—“Improvements in the construction of chaldron-wagon and other railway wheels.”

In this invention wheels are constructed in four parts, "of which  
 " two spokes, two portions of the rim or felloe, and one quarter  
 " side or segment of the nave form one part or fourth. The  
 " spokes being made solid on the piece forming one side or seg-  
 " ment of the nave are then bent to form a portion of the rim or  
 " felloe, each extreme end of such portion having a tenon to fit  
 " into the shoulder of the portion of the rim or felloe next it  
 " through a mortice. These four parts of the wheel are fitted  
 " together, and the four nave sides or segments are secured by  
 " strong hoops contracted thereon. These parts form the entire  
 " skeleton wheel, on which the tyre is shrunk in the usual  
 " manner. The axle end (square or round) is wedged or keyed  
 " on to the nave according to common practice."

The wheel is composed "entirely of malleable iron."

[Printed, &c. Drawing.]

A.D. 1858, February 4.—N° 204.

**HARLAND, ROBERT.**—"Improvements in the break lever guard  
 " of railway trucks."

The patentee mentions in the first place that the break lever  
 guards of railway trucks have usually been composed of suitably  
 bent pieces of iron attached to the truck side or frame, and pro-  
 jecting downwards near the wheels, and that such guards were  
 constantly liable to be injured or even struck off by accidental  
 contact with other objects when the trucks were in motion; and  
 he then sets forth the leading feature of this invention as consist-  
 ing in jointing or otherwise attaching to the break lever, at or near  
 the outer end thereof, "a quadrant or segment of wrought iron,  
 " which moves through a suitable bearing fastened to the side of  
 " the truck, the segment (which forms the break lever guide)  
 " extending upwards above instead of below the break lever. The  
 " lever, when out of work, is held by means of a catch, which is  
 " fastened to the side of the truck, and which also rubs or presses  
 " against the side of the segment when the break is put on, and  
 " thus steadies it whilst at work."

Different modifications of the invention are described, in one  
 case the guard consisting of a straight bar passing upwards  
 through a socket, while in another case the guard is curved and  
 notched and attached to the end of the truck; in another case the  
 guard consisting of a straight rack connected to the lever, and

passing through a socket; pins, catches, and other mechanism being employed to hold the lever in place "when in work."

[Printed, 1s. 2d. Drawings.]

A.D. 1858, February 5.—N<sup>o</sup> 216.

WELCH, JAMES.—"Improvements in railway and other carriage  
"brakes."

The object of this invention is to construct an apparatus  
"capable of being brought into action by means of the pressure  
"of the ordinary buffing machinery of railway carriages or other-  
"wise, by the reversed action of the propelling power, without  
"impediment to the carriage being pushed backwards by the  
"buffers immediately after it has stopped in the usual manner,  
"and without the necessity of awaiting the recoil of the buffer  
"springs." Upon the axle of a railway or other carriage, in  
addition to the ordinary running wheels, the patentee applies  
"a drum or wheel running loose upon the axle, but furnished  
"with a spring catch acting against a stop on the running wheels,  
"or other suitable contrivance for engaging the drum with the  
"running wheels, and so compelling the drum and wheels to  
"revolve together when moving in a forward direction, and for  
"disengaging itself from them when moving in a backward  
"direction. To this drum is applied a brake in the ordinary  
"shape of a block of wood, or any other kind of suitable brake,  
"to be acted upon through the medium of the drums by means  
"of the backward pressure of the ordinary buffing apparatus, or  
"otherwise to be brought into action by the reversed action of  
"the propelling power, and the same brake may also be so ar-  
"ranged as to be brought into action by the ordinary hand appa-  
"ratus, if required. The carriage may run either end foremost,  
"the spring catch (which may be adjusted almost by a touch) at  
"the commencement of the journey being set accordingly; should  
"this act, however, be omitted, the carriage will still run as usual,  
"and no further inconvenience will result than that the brake  
"will not act till the catch be properly adjusted. The buffer  
"rods are so constructed as to exert upon the brakes such an  
"amount of pressure only as they can safely bear without break-  
"ing; when such pressure is exceeded, the excess is diverted  
"from the brakes entirely to the buffer springs. It is evident  
"that while the carriage is advancing, and the spring catch of



" the drum is in contact with the stop on the running wheels, they will be compelled to revolve in a forward direction together, and when the brake presses upon the drum, the same effect will be produced through the medium of the drum in stopping the carriage wheels as though the brake operated in the ordinary manner directly on the running wheels. When the carriage has been brought to a state of rest by the operation of the brake, it may be immediately backed in the ordinary way by force, still pushing against the buffers, the spring catch of the drum not preventing the backward motion of the running wheels, the stop on them being released from the catch by such backward motion. On the withdrawal of the pressure against the buffers, the recoil of the buffer springs will release the brakes, and the wheels will be free to move onwards as before."

[Printed, 1s. 4d. Drawings.]

A.D. 1858, February 8.—N° 233.

JOHNSON, RICHARD WILLIAM, and STABLEFORD, WILLIAM.—"Improvements connected with the break levers of railway wagons."

The patentees mention, in the first place, that the levers ordinarily used to apply and remove the break blocks of railway wagons are in some cases retained in the desired position by being thrust laterally into the notches of notched bars or racks affixed to the wagons, while in other cases this object is effected by there being connected to the levers bars provided with perforations through which pins are passed, both these systems being attended with inconveniences which it is the object of this invention to remedy. And the invention consists "in connecting by a bolt, hinge, or pin to the back part of the lever a bar cut with rack teeth on either edge, and made to pass through a guide on the sole or side rail of the wagon, and in fitting a paul in a convenient position for taking into the teeth on the bar." The latter may be either in the shape of a quadrant or segment, which, working through the guide, balances the lever in position and prevents it jumping off its seat," or it may be straight, and work in a groove in the body of the wagon. Thus, on the lever being depressed in applying the break the paul keeps it in the position into which it has been lowered, and on liberating the

paul from the teeth the lever may be restored into its first position; the application of the break and fixing it when applied requiring "one operation only."

[Printed, 10d. Drawing.]

A.D. 1858, February 11.—N° 254.

CHAMBERS, AUSTIN, and CHAMPION, WILLIAM HARRISON.—"Improvements in railway breaks."

This invention relates to "improved means of connecting the breaks of several railway carriages forming a train, and to the mode of establishing a communication between them and the motive power whereby they (the breaks) are to be actuated, and consists, firstly, in the use, for the first-named purpose, of connecting rods communicating with a lever fixed upon the ordinary transverse break shaft of each carriage. The opposite ends of the rods are attached to the opposite ends of levers, having their fulcrums at the junction of radius bars attached to the ends of adjoining carriages to allow for the collapse of the train;" or, otherwise, rods are attached to the levers of the transverse break shafts, "but communicating with each other by means of cords or chains passing over pulleys attached to radial links or rods situated between the carriages," in a manner similar to those described in the Specification of the Patent of Chambers and Champion, dated the 10th of February, 1857, which cords or chains are provided with means whereby they may be tightened as occasion requires.

Another part of the invention consists in so forming the communication between the breaks of the different carriages composing a train, "by means of chains and cords or rods, or rods only, in connection with suitable levers, as to cause the effect of whatever power may be applied to bring them into action to be distributed equally among the various breaks attached to the several carriages." Various modifications of this, as well as of the first part of the invention, are described, the invention including an arrangement whereby in case of the breakage of a chain or other connection between the breaks, one set of breaks may continue to be worked as before, notwithstanding such breakage; and also the use of a notched chain holder, applicable to securing the chains in any desired positions. These arrangements are very fully set forth, and illustrated by Drawings containing a large

number of Figures, which it will be necessary to inspect in order to understand the details of the invention.

[Printed, 1s. 4d. Drawings.]

A.D. 1858, February 17.—N° 302.

HEYNS, PATRICK. — "Improvements in wheels and axle-boxes."

This invention relates to wheels which may be applied to vehicles used on common roads as well as to those employed on railways, the invention including "an improved form of axle-box" and journal, applicable to those wheels which turn loosely upon their axles, whereby the ordinary nuts or collars hitherto employed for keeping the wheels on their axles are dispensed with."

The invention consists mainly in forming the hub of the wheel "of plate iron or other metal," such hub being "made in two parts, the one being provided with a number of radial recesses, into which the inner ends of the spokes, which are made of wood, are driven. When in position the second portion of the hub is brought up to the first, so as to bear against the sides of the spokes contained within the recesses, and bolts are passed through the whole and through the centre of each spoke, so as to secure the whole together. The felloes and tires are then fitted on in the ordinary or any other manner, so as to complete the wheel." The patentee proposes in some cases to substitute for the spokes a disc of sheet metal or other suitable material, the inner or central portion being held between the two halves of the hub, whilst the periphery is secured in any suitable manner to the rim or felloe of the wheel, thus producing a solid instead of an open wheel. Suitable apertures may, however, be cut out of the plate for the purpose of giving increased lightness and elegance to the wheel. The improved axle-box is made in two halves, so as to open longitudinally or in the direction of the axle journal, and an annular recess is formed in the interior of the axle box for the purpose of receiving a corresponding collar formed on the axle journal. It will thus be obvious that on bolting the two halves of the axle-box together the journal will be effectually retained inside by reason of the projecting collar." This axle-box may be adapted either

to an ordinary wheel or to wheels of the construction set forth above.

The patentee mentions in particular that wheels formed according to the present invention will be found to be admirably adapted for omnibuses, carts, cabs, "and indeed all vehicles running in crowded thoroughfares, since from the fact of their hubs being flush or nearly so with the felloe of the wheel there will be less danger of accident by running foul of other vehicles," while at the same time "greater width can be given to the body of the vehicle, which is a most important desideratum in omnibus building."

[Printed, 10d. Drawing.]

A.D. 1858, February 18.—N° 308.

CRISPIN, WILLIAM HENRY.—(*Provisional protection only*).—

"Improvements in the construction of bearings, beds, and sockets for axles, shafts, pivots, and other rotating parts of machinery."

This invention relates to arrangements for preventing the inconvenient heating of the bearings, beds, or sockets of axles, shafts, and other parts of machinery, and consists in constructing a chamber or aperture in the lower or any other suitable part of such bearings or sockets, through which a continuous stream of water is caused to flow, the ingress and egress of which is effected by means of suitable tubes and apertures arranged for the purpose. The particular construction of these tubes and apertures is not set forth, the inventor merely stating that the quantity of water required is very small, inasmuch as that portion which has become heated and expanded by the absorption of heat from the surrounding metal will, upon its egress from the chamber or aperture mentioned above and passage through the tubes again become cool before returning to such chamber or aperture, "thus keeping up a continuous current according to well-known principles."

[Printed, 4d. No Drawings.]

A.D. 1858, February 19.—N° 315.

BEATTIE, JOSEPH. — "Improvements in locomotive and other steam engines, parts of which improvements are respectively applicable to other purposes."

One part of this invention relates to the axles of railway engines and carriages, and is described under different modifications. In one of these a hollow axle is formed of six "five-sided bars," which after being put together are heated, welded together, and the axle then finished by hammering or rolling. In another modification "semi-faggots" are used, between which spaces are left. In another modification "segmental bars" are used, while in other modifications hollow faggots of various forms are employed, in some cases the ends of such faggots being formed with "joggled pieces."

Another part of the invention relates to the axle boxes of railway engines and carriages. According to one modification of this part of the invention the axle box is, in the first place, formed of two pieces of wrought or malleable iron, joined together by bolting, the joint being vertical, the interior of the box thus formed being then bored out for the reception of a brass bearing, which latter is, however, turned up upon an eccentric mandril, the result being that a greater thickness of metal is obtained at the upper than at the lower part of such bearing. The latter is, moreover, cored or grooved for the admission of white metal, this forming a lining to the bearing, which is also thicker at the top than at the bottom. Brass tubes are screwed into the axle box and bearing, these not only preventing the latter from moving in the box, but also serving as inlets for oil. Below the bearing is a chamber for the reception of cotton wick or sponge, which absorbs oil, and by pressing against the axle keeps the latter lubricated, the bearing, moreover, being grooved at each end for the reception of metal discs, between which cotton wick is wound round the axle, the ends of the wick descending to the oil chamber. The wick may, however, enclose coiled springs, by which arrangement dust or sand will be more effectually excluded from the axle box. A bolt carrying a suspension link from which the bearing spring is hung forms also a part of the arrangement, as also flanges on the top of the box, in which work steel facings which are attached to the horn plate, these parts being so contrived as to be adjustable. Other modifications of this part of the invention are set forth, in some cases the axle box itself being made of brass, thus merely requiring a lining of white metal; while in other cases the axle box is of cast iron, and provided with bearings of brass or other metal, which may be made in two pieces, having between them at the top a slot covered with wire gauze, through which oil may be



introduced, a moveable chamber below the axle containing springs by which cotton wick or sponge is pressed against the axle, returning thereto the oil which descends from the upper slot, other minor details being introduced according to circumstances.

Another part of the invention relates to arrangements for supporting the axles of engines and carriages in case of such axles breaking, this part of the invention consisting mainly in applying between the two sides of the under framing of the engine or carriage a transverse frame from which descend guides with which curved and flanged caps are connected, the latter surrounding the axle, which works freely within them, and, in case of the breakage of such axle, supporting it, the wheels being at the same time preserved in position by rollers suitably arranged for the purpose. These arrangements are set forth under different modifications, and the patentee proposes to add to the ordinary width of the tyres of the wheels, as an additional security against their leaving the rails. In some cases the rollers mentioned above may be bored excentrically, and be so arranged that in the event of the axle breaking they will act so as to retard the motion of the wheels.

[Printed, 2s. 4d. Drawings.]

A.D. 1858, February 19.—N° 320.

MAW, EDWIN.—(*Provisional protection only.*)—"Improvements  
" in the manufacture of iron wheels."

According to this invention the rings or felloes of the wheels  
" are of angle iron, with or without flanches or flanch tyres,  
" according as the wheels are to run on railways or other roads.  
" The bosses or naves are constructed by casting on discs of  
" wrought iron, which project beyond the cast iron in such  
" manner as to have spoke fixed thereto. The spokes are of  
" angle iron, and the ends are respectively fixed to the webs of  
" the outer rings and to the projecting parts of the wrought-iron  
" discs of the naves or bosses, and such fixing of the spokes is by  
" preference by rivets and bolts."

[Printed, 4d. No Drawings.]

A.D. 1858, February 20.—N° 326.

NETHERSOLE, WILLIAM EDWARD.—"Improvements in the  
" construction of parts of railway carriages."



One part of this invention relates to the axles of railway engines and carriages, and is described under different modifications. In one of these a hollow axle is formed of six "five-sided bars," which after being put together are heated, welded together, and the axle then finished by hammering or rolling. In another modification "semi-faggots" are used, between which spaces are left. In another modification "segmental bars" are used, while in other modifications hollow faggots of various forms are employed, in some cases the ends of such faggots being formed with "joggled pieces."

Another part of the invention relates to the axle boxes of railway engines and carriages. According to one modification of this part of the invention the axle box is, in the first place, formed of two pieces of wrought or malleable iron, joined together by bolting, the joint being vertical, the interior of the box thus formed being then bored out for the reception of a brass bearing, which latter is, however, turned up upon an eccentric mandril, the result being that a greater thickness of metal is obtained at the upper than at the lower part of such bearing. The latter is, moreover, cored or grooved for the admission of white metal, this forming a lining to the bearing, which is also thicker at the top than at the bottom. Brass tubes are screwed into the axle box and bearing, these not only preventing the latter from moving in the box, but also serving as inlets for oil. Below the bearing is a chamber for the reception of cotton wick or sponge, which absorbs oil, and by pressing against the axle keeps the latter lubricated, the bearing, moreover, being grooved at each end for the reception of metal discs, between which cotton wick is wound round the axle, the ends of the wick descending to the oil chamber. The wick may, however, enclose coiled springs, by which arrangement dust or sand will be more effectually excluded from the axle box. A bolt carrying a suspension link from which the bearing spring is hung forms also a part of the arrangement, as also flanges on the top of the box, in which work steel facings which are attached to the horn plate, these parts being so contrived as to be adjustable. (Other modifications of this part of the invention are set forth, in some cases the axle box itself being made of brass, thus merely requiring a lining of white metal; while in other cases the axle box is of cast iron, and provided with bearings of brass or other metal, which may be made in two pieces, having between them at the top a slot covered with wire gauze, through which oil may be

introduced, a moveable chamber below the axle containing springs by which cotton wick or sponge is pressed against the axle, returning thereto the oil which descends from the upper slot, other minor details being introduced according to circumstances.

Another part of the invention relates to arrangements for supporting the axles of engines and carriages in case of such axles breaking, this part of the invention consisting mainly in applying between the two sides of the under framing of the engine or carriage a transverse frame from which descend guides with which curved and flanged caps are connected, the latter surrounding the axle, which works freely within them, and, in case of the breakage of such axle, supporting it, the wheels being at the same time preserved in position by rollers suitably arranged for the purpose. These arrangements are set forth under different modifications, and the patentee proposes to add to the ordinary width of the tyres of the wheels, as an additional security against their leaving the rails. In some cases the rollers mentioned above may be bored excentrically, and be so arranged that in the event of the axle breaking they will act so as to retard the motion of the wheels.

[Printed, 2s. 4d. Drawings.]

A.D. 1858, February 19.—N<sup>o</sup> 320.

MAW, EDWIN.—(*Provisional protection only.*)—"Improvements in the manufacture of iron wheels."

According to this invention the rings or felloes of the wheels "are of angle iron, with or without flanches or flanch tyres, according as the wheels are to run on railways or other roads. The bosses or naves are constructed by casting on discs of wrought iron, which project beyond the cast iron in such manner as to have spoke fixed thereto. The spokes are of angle iron, and the ends are respectively fixed to the webs of the outer rings and to the projecting parts of the wrought-iron discs of the naves or bosses, and such fixing of the spokes is by preference by rivets and bolts."

[Printed, 4d. No Drawings.]

A.D. 1858, February 20.—N<sup>o</sup> 326.

NETHERSOLE, WILLIAM EDWARD.—"Improvements in the construction of parts of railway carriages."

" require to be connected to springs, and the draw bar to play in  
" and out under the carriage."

[Printed, 4d. No Drawings.]

A.D. 1858, March 2.—N<sup>o</sup> 407.

**SKELLY, JOHN.**—"Improvements in carriage springs."

This invention relates not only to springs for carriages, but also to "other similar springs," the object of the invention being so to form carriage and other springs "that they shall be more  
" simple in construction than those in ordinary use, and at the  
" same time possess a graduated action;" and the improvements consist, first, "in using a single top and bottom leaf, which meet  
" at their extremities, and are there united by any convenient  
" means in ordinary use. These leaves taper from the middle to  
" their ends, and are curved in proportion to their required  
" strength," a longitudinal bar passing between them, upon one  
" end of which is a screw thread, "to receive a nut for regulating  
" the elasticity of the said leaves or springs."

The invention also includes a mode of making one spring answer the purpose of the double spring mentioned above, "and  
" in giving to a spring a propelling power when the vehicle is in  
" motion, which latter is accomplished in the following manner:—  
" The bottom leaf is hinged at the centre, opening from below,  
" with two flanges projecting downwards, the under one being  
" longer than the front one," and being "made to receive the  
" axle of the wheel;" the hinder flange "pressing on the axle of  
" the wheel from behind," and thus producing a "propelling  
" effect," "especially on uneven roads." For light carriages with two wheels the patentee constructs springs of four separate curved levers, "that is to say, two on either side, the upper ends  
" being bolted to the body of the carriage, and the lower to the  
" under side of each shaft, fore and back."

Different modifications of the invention are described, these including arrangements suitable for buffer, bearing, and other springs; adapted for use in not only railway but other carriages.

[Printed, 8d. Drawing.]

A.D. 1858, March 2.—N<sup>o</sup> 412.

**HOOPER, WILLIAM.**—"Improvements in the manufacture of  
" buffer and other springs when vulcanized india-rubber is  
" used."

" according to the direction in which the square rod is turned." And in order " to extend this action to as many breaks as may be fitted along the whole train," the patentee slides " over each end of every rod a correspondingly shaped case terminating outwards in a fork ; and any two of these forks, when united by pins standing at right angles to each other, form a universal joint. This joints permits of the train travelling in any curve, and the cases sliding on the rods, and the rods themselves being free to slide, allow of play between the carriages without the rods being liable to become disconnected. Coiled springs are applied to ensure the rods resuming their proper position after having been drawn outwards from either end of any carriage."

" It will be obvious that instead of a square rod a circular bar, with a feather working through a tongue in the worm or worm wheel, might be used," the patentee stating, however, that for various reasons " he prefers the arrangement first described.

[Printed, 10d. Drawing.

A.D. 1858, February 24.—N<sup>o</sup> 364.

KAYE, CHARLES.—(*Provisional protection only.*)—" Improve-  
ments in couplings for connecting and disconnecting wagons  
and other carriages on railways."

The object of this invention is to couple and uncouple railway carriages and wagons without an attendant passing between them, and consists of apparatus which is to be substituted for the ordinary central coupling. For wagons or carriages having " dead buffers," that is, buffers without springs, a metal loop is hinged to the draw bar of each carriage or wagon, which is of sufficient length to pass over the hook of the next wagon or carriage. Under the draw bar, or to the fore part of the frame of the carriage or wagon, the inventor fixes a wheel or wheels, and then connects the metal loop " by chain, wire, or other rope, or equivalent " to the wheel or wheels ; he then carries the chain or its equivalent from the front of the wheel or wheels, connects it by a pin or otherwise to the loop, and passes it over a pulley or roller placed above the draw bar down again to the wheel or wheels. The axis of the wheel or wheels extends beyond the carriage or wagon on each side, there being connected thereto, at each side, a weight, and " by the raising or lowering of the weights, either or both of them," without going between the vehicles, the loop is brought down or raised, and the coupling or uncoupling effected. " For carriages with spring buffers the pulleys and draw bars



" require to be connected to springs, and the draw bar to play in  
" and out under the carriage."

[Printed, *W.* No Drawings.]

A.D. 1858, March 2.—N° 407.

**SKELLY, JOHN.**—" Improvements in carriage springs."

This invention relates not only to springs for carriages, but also to " other similar springs," the object of the invention being so to form carriage and other springs " that they shall be more  
" simple in construction than those in ordinary use, and at the  
" same time possess a graduated action ;" and the improvements consist, first, " in using a single top and bottom leaf, which meet  
" at their extremities, and are there united by any convenient  
" means in ordinary use. These leaves taper from the middle to  
" their ends, and are curved in proportion to their required  
" strength," a longitudinal bar passing between them, upon one  
" end of which is a screw thread, " to receive a nut for regulating  
" the elasticity of the said leaves or springs."

The invention also includes a mode of making one spring answer the purpose of the double spring mentioned above, " and  
" in giving to a spring a propelling power when the vehicle is in  
" motion, which latter is accomplished in the following manner :—  
" The bottom leaf is hinged at the centre, opening from below,  
" with two flanges projecting downwards, the under one being  
" longer than the front one," and being " made to receive the  
" axle of the wheel ;" the hinder flange " pressing on the axle of  
" the wheel from behind," and thus producing a " propelling  
" effect," " especially on uneven roads." For light carriages with two wheels the patentee constructs springs of four separate curved levers, " that is to say, two on either side, the upper ends  
" being bolted to the body of the carriage, and the lower to the  
" under side of each shaft, fore and back."

Different modifications of the invention are described, these including arrangements suitable for buffer, bearing, and other springs ; adapted for use in not only railway but other carriages.

[Printed, *8d.* Drawing.]

A.D. 1858, March 2.—N° 412.

**HOOPER, WILLIAM.**—" Improvements in the manufacture of  
" buffer and other springs when vulcanized india-rubber is  
" used."

In this invention "each spring is moulded with a projection " with dovetail or inclined sides, in order to fix such spring in a " recess of a corresponding form," so that the spring is fixed by such projection. The exterior of the spring may be varied in form, "according to the object to be accomplished. In some " cases a buffer or other spring will simply be in the form of a " single block," while in other arrangements "a spring will be in " the form of a succession of blocks of india-rubber combined by " blocks of lesser diameter, all cast in one block, and fixed by a " dovetail projection, as above mentioned."

Different modifications of the invention are described, each modification being applicable to the purposes of a buffer.

[Printed, 6d. Drawing.]

A.D. 1858, March 4.—N° 427.

URE, JAMES MILLAR. — (*Provisional protection only.*)—"Improved apparatus for lifting the driving wheels of a locomotive " off the rails, and which can be used when the locomotive is " either running or stationary."

This apparatus, whilst it can be used when the locomotive is stationary, is more particularly designed to enable the engine driver to prevent the rotation of the driving wheels when an incline is being descended, or when other circumstances may render it desirable. According to one arrangement of the apparatus the desired effect is produced by lifting the driving wheels in the guides in which the axle boxes work, but this plan is only applicable in cases in which there is a certain amount of space below the boiler for the elevation of the crank axle and parts connected therewith. By another plan the leading and trailing wheels are depressed, thus raising the driving wheels; the axle boxes of the latter having been previously locked in order to cause them to rise with the framing.

The invention is carried into effect by the use of cylinders fitted with pistons, the rods of the latter being connected by means of bell crank levers or other suitable mechanism to the parts which it may be required to lift or depress; steam being admitted to such cylinders from the boiler of the engine when requisite.

[Printed, 4d. No Drawings.]

A.D. 1858, March 5.—N° 441.

VASSEROT, CHARLES FRÉDÉRIC. — (*A communication from François Dory and Joseph Badin.*)—"Improvements in the man-



"facture of wrought-iron wheels for locomotives, tenders, waggons, &c."

This invention consists "in making wrought-iron wheels of one piece by the combination and simultaneous welding of all the pieces which compose the said wheels."

In carrying out the invention a band of iron is first prepared by the use of a hammer, or by the "flatting mill," with certain "swellings" at the middle and the ends. It is then bent, upon a matrice or anvil, so as to form two "semi-spokes," and a portion of the rim of a wheel, the ends, which come together at the nave, being rivetted together, each part being the counterpart of another, and the whole being ultimately welded together by suitable means.

The invention includes the use of a peculiar form of "pincers" or tongs made use of for handling the wheels when under the "process of heating and welding."

[Printed, 6d. Drawing.]

A.D. 1858, March 6.—N° 458.

CLARE, JOHN WILLIAM. — "Improvements in apparatus for stopping or retarding railway engines, carriages, and trains, and communicating signals between parts of a train."

According to this invention "a tube is placed under a carriage, being supported so as to be free to revolve in blocks or frames, which are fitted on the axles so that the latter may turn within them, and are kept in position by a brace bar; and a band wheel is secured on the axle, surrounded by a band, attached at one extremity to the block and at the other to a lever or rod connected to and centred on the block, and having attached to it one end of a chain, the other end of which is connected to the tube; or, the levers may be centred on and the bands connected to the brace bar, instead of centering the levers on and connecting the bands to the block. The tubes have suitable coupling arrangements, so that they may form a continuous tube or series of tubes when the carriages are made up into a train, but yet allow necessary play for deviations of the line. A toothed wheel is mounted on the tubes of the break vans and tender, or so as to be at the ends or other convenient part of the train; and with this wheel, in order to stop the carriages, a pinion is put in gear, so that by actuating it the tubes may be caused to turn

" and wind the lever chains around them, thereby causing the levers to tighten the bands on their wheels and stop them, and thus retard and ultimately stop the axles and wheels of the carriages. The levers are afterwards, where necessary, restored to position by springs." When there are more than two axles to a carriage of ordinary length it will be sufficient to fit these arrangements to two of them.

The invention "may be applied to engines when the construction will permit, and the tube actuating wheel may be made by suitable arrangements to act, after a certain number of revolutions, on a lever for shutting off the steam, if not done in due course by the driver."

For signalling between the different parts of a train "ratchets or rattling contrivances" are used; or when the tubes are coupled by means of air-tight connections they may be used to convey verbal signals. The details of the invention may be variously modified.

[Printed, 8d. Drawing.]

A.D. 1858, March 15.—N° 529.

WALLIS, ARTHUR, and HASLAM, CHARLES.—"Improvements in engine, machine, and other like bearings."

This invention consists "in a novel construction of the seats or plummer blocks and bearings of engines and machinery in general, which renders them self-adjusting, and allows of their accommodating themselves to any ordinary deflection of the axles or spindles working in them, so as to prevent their binding, wearing crossways, or any like derangement."

The bearings made according to these improvements are "externally of a spherical figure," whether divided either centrally or otherwise, and are bored as usual for the reception of the axle or spindle, and the cast-iron or other seats or plummer block, together with their caps, are turned internally in such a manner that when put together their interior surfaces form a spherical cavity, "minus two segments cut off by two parallel planes at right angles to the axis of the plummer block, the axle or spindle passing out on either side of the seat or plummer block through the spaces left by the two segments so cut off, so that on the aforesaid spherically-shaped bearings being placed in the portion of the cavity contained in the lower half of the seat or

"plummer block, and the upper part or cap being adjusted over  
"it in its place, the bearing will turn freely in any direction  
"within certain limits.

The bearings "may be lightened in weight by being channelled  
"at right angles to the axes of the spindles," and the details of  
the invention be otherwise variously modified.

[Printed, 6d. Drawing.]

A.D. 1858, March 19.—N° 563.

AERTS, PAUL FRANÇOIS.—"Improvements in the construction  
"of railway rolling stock, and in the lubrication thereof, and  
"other moving parts of machinery."

This invention consists, firstly, "in a novel construction of  
"railway carriage, peculiarly suitable for lines with severe curves,  
"and for the easier and safer conveyance of timber and other  
"lengthy material." The framework of the carriage is mounted  
upon a metallic framing, which is constructed in three parts,  
being connected thereto by suitable pivots, and stays being  
arranged so as to prevent any improper action of the parts. The  
middle part of the metallic framing is "the guiding part," and  
the patentee states that on the carriage entering a curve "the  
"curvature of the rails displaces the centre part by the action of  
"the rails on the wheels, which in its turn forces the two end  
"parts to incline in the direction of the centre between the  
"rails." Various advantages are mentioned as attending this  
system.

Another part of the invention consists in forming the inner  
boss or nave of each carriage wheel longer than usual, and fixing  
"in suspension, almost immediately above and over the inner  
"end of the boss, a strong horse-shoe shaped plate of iron,"  
which the patentee calls a "safety plate," and which is attached  
to the under framing of the carriage. On the breakage of an  
axle, such plate, by resting on the prolonged boss of the wheel  
and partly embracing the sides thereof, will prevent the wheel  
from leaving the rail, and no "shock or other inconvenience will  
"be felt by the passengers."

The third part of the invention consists in "the substitution  
"for the usual metallic springs of railway carriages of a system  
"of suspension which shall diminish the ordinary wear and tear,  
"and effect a more easy and silent riding of the carriage."

Blocks or rings of india-rubber are placed in a cylinder, which is mounted directly over the axle box, such india-rubber serving as a central spring, while from this cylinder proceed diagonal rods, at the lower ends of which are plates or discs bearing against other india-rubber rings placed in other cylinders, the result being that a shock communicated to the central spring can only act upon the carriage after passing through the india-rubber in the other cylinders, all the cylinders being, of course, bolted to the frame of the carriage, and the india-rubber being combined, if desirable, with wooden or metallic plates, or metallic springs, or, if preferred, a single block of india-rubber being placed in each cylinder.

As regards lubricating, the invention relates not only to railway axles but to the journals or bearings of machinery in general. The patentee states that he prefers water as a lubricant, but that the arrangements forming this part of the invention "are applicable, with unimportant variations, to oil, or a mixture of oil and water, or other liquid." At the end of the axle is a wheel or disc, which dips into a reservoir of water placed at the lower part of the axle box, and on the carriage being put in motion the rotation of this disc or wheel throws a portion of the water continually upwards and against a "double-fronted" piece of zinc or other material which the patentee calls a "divergent," and which distributes the water "in a continuous stream over the journal of the axle." This arrangement may be employed in combination with the ordinary grease box, which, on the failure of water in the reservoir, will supply a lubricant on the axle becoming heated. The patentee states that the mode of carrying out this part of the invention may be greatly varied, "either by changing the material used in construction, or by varying the form of the wheel or of the divergent, or by the use of any other mechanical contrivance."

[Printed, 10d. Drawing.]

A.D. 1858, March 23.—N<sup>o</sup> 602.

STOCKER, ALEXANDER SOUTHWOOD.—(*Provisional protection only.*)—"Improvements in the manufacture of railway axles and tubes."

According to this invention it is proposed in the first place "to make axles and journals out of coiled tubes, or one or more

" tubes or pieces of metal drawn over or placed one within or over  
 " the other, the main tube forming the body or central part of the  
 " axle being shrunk or otherwise fixed on to other shorter  
 " tubes which form the journals, and which are, if necessary,  
 " further secured thereto by passing bolts through them."

The details of the invention are set forth at considerable length, the inventor mentioning that it will be found advantageous to insert a coil of iron into a steel or steel-iron tube of desirable thickness, and that "a second and similar tube may, when great  
 " or unusual strength be desired, be inserted into the interior of  
 " the coil," the whole then being passed through rolls, "receiving  
 " at a proper state of fusion external and internal pressure, thereby  
 " becoming one solid mass." A tube thus manufactured will be completely enveloped in or have an intact coating of steel or steel iron on both its inner and outer surfaces, and will be very suitable for a hollow axle, but sheets of iron and steel or steel iron may be  
 " coiled up solid, not as a tube, and passed through rollers at a  
 " proper state of fusion, when they will become one solid mass or  
 " bar of layers of iron and steel or steel iron, taking care that the  
 " last wrapper on the outside is steel or steel iron, for it will be  
 " stronger and more elastic when so made. The journals may be  
 " formed in the ordinary manner."

The axle may also be formed of a coil of iron or steel, or steel iron, or by placing one tube within another, "multitubular as it  
 " were," or by combining solid bars of iron or steel, or both, with one main tube. Or tubes may be turned so as to fit tightly one into another, and be forced together by hydraulic or other pressure.

The inventor states that although steel iron, when it has passed through the puddling furnace, will be found to answer some of the purposes mentioned, he prefers it after it has been first rolled into billets, bars, or sheets, to be cut up in lengths and piled, and then remanufactured by being passed through a ball furnace, being afterwards hammered and rolled out as may be requisite.

The invention may be applied not only to the manufacture of axles, but also to locomotive boilers, steam, and other tubes.

[Printed, 4d. No Drawings.]

A.D. 1858, March 25.—N<sup>o</sup> 626.

HOPKINS, DAVID A.—"Improvements in journal boxes."

*This invention consists, in the first place, in "providing the*



"housing with a diaphragm," or arranged as to prevent the ingress and egress of air into and out of such housing.

Secondly, in the employment of a boss or its equivalent upon the axle, having its location inside of the housing, and feeding the oil only to that portion of the axle, not between the packing and the boss, the latter being formed either by turning a recess in the axle or by any other convenient means.

Thirdly, in the employment of a moveable packing or stuffing box, fitting closely to the axle, and kept up by spring or other suitable pressure to the side of the housing, such packing being capable of being moved with the journal without opening a passage for air or dust into the housing.

Fourthly, in a certain construction and arrangement of the bearing brass or box and its casing or backing, by which the bearing is secured more effectually than usual, the friction of the axle is reduced without reducing its security in its bearings, the article is less expensive in its construction, "and capable of being entirely worn, except the flanges which hold it in place."

The details of the invention are minutely described, but will not be clearly understood without the inspection of the Drawing annexed to the Specification.

[Printed, 8d. Drawing.]

A.D. 1858, March 27.—N° 649.

JONES, EDGAR CHICHESTER.—(*Provisional protection only.*)—"Improvements in railway brakes."

In this case the inventor proposes, "without dispensing with the ordinary brake now used on railway vehicles, to apply an extra braking power," and to "carry the power or pressure to the inner side, and partially upon the top of the rails, by means of apparatus composed of connecting rod, cog wheel, and chain connecting the brake wheel with the guard's wheel, and other mechanical parts to sustain them or confine their action; the whole to be worked by the ordinary brakes, or to be so intimately connected thereto as to work simultaneously therewith."

[Printed, 4d. No Drawings.]

A.D. 1858, March 29.—N° 663.

BAILLIE, JOHN.—"An improved construction of coiled spring."

This invention relates to the manufacture of coiled springs.



" applicable to railroad carriages and other like uses, from bars  
 " or plates of steel of equal breadth from end to end, but taper-  
 " ing in thickness, the thinner end of the plate or bar forming  
 " either the inner coil or the outer coil, as may be thought  
 " desirable."

An arrangement is described in which a spring is composed of a bar, the thinner end of which forms the inner coils, the patentee stating that by thus tapering the thickness of the metal, while at the same time an equable breadth is maintained throughout the spring, except at the extremities, which are trimmed square, he is enabled to make either the outer or the inner coils (as the special application of the spring may require), sufficiently sensitive to yield to slight forces, and that as the following coils gradually increase in thickness, and come successively into action, they will increase the power of resistance against greater forces. "A further advantage obtained is, that the range or play of the spring can be doubled in comparison with the volute springs now in use, without materially increasing their diameter."

[Printed, 8d. Drawing.]

A.D. 1858, March 31.—No 681.

WESTHEAD, MARCUS BROWN, and BAINES, HUGH.—(*Provisional protection only.*)—"Certain improved apparatus for coupling or connecting carriages, wagons, trucks, vans, and engines used or employed upon railways."

This invention relates to a self-acting coupling for railway engines and vehicles, and also to the adjustment of such coupling. The coupling consists of "a novel form or arrangement of hook or rack" combined with certain springs, levers, and wheels, which, when the carriages, &c. are put together, "will be projected into a trumpet or funnel shaped mouth; this funnel has flanges or shoulders inside to receive the hook or rack; these funnels may be made either circular or oval, or of any other form that may be most convenient or suitable. Each carriage, &c. will have at either end a funnel and hook or rack, so that they will always fit when the carriages, &c. are reversed in their direction, and there is a joint or swivel at the back of each funnel, hook, or rack to allow for the difference in the heights of the carriages, &c. The funnel, hook, or rack will be secured upon the bar to which the present hook and shakling are attached, and will act in their stead."

The wheels and levers mentioned above in connection with the springs "are for the purpose of detaching the carriages, &c. from each other, which can be effected instantaneously either by levers connected to the carriages, &c." or by detached levers which are kept in readiness "at the required places on the road." It is not stated how these levers are to be used, but it is mentioned that by the use of such levers the carriages, &c. may be detached from each other without a person passing between them.

That part of the invention which relates to the adjustment of couplings consists in the use of a rack and pinion, or screw and mitre wheels, in connection with a ratchet wheel and shaft "for the purpose of tightening up or slackening the 'buffers' of the carriages, &c.," and thus always allowing them to be "evenly coupled."

[Printed, 4d. No Drawings.]

A.D. 1858, March 31.—N° 685.

CROKER, BLAND WILLIAM.—(*Provisional protection only.*)—"Improvements in axle boxes, to render them self-lubricating."

The object of this invention is to lubricate the axle boxes of locomotive engines and tenders, as well as of railway and other carriages and vehicles, "without using packing, sponge, or other similar substances for retaining the oil, grease, or other lubricating matters intended to be applied to the bearings." For this purpose the inventor attaches a disc or discs to the outer end of the axle, such disc or discs dipping into the lubricating material, which is contained in a suitable receptacle, and conveying a supply of such material to the axle step, or bearing. Each disc or plate passes through an opening in a fixed plate of zinc or tin, such plate collecting the lubricating material and directing it upon the axle step, and this whether the axle be revolving in one direction or the other, the superfluous material descending into certain "depositing chambers" in order to be purified, and the apparatus being provided with suitable orifices furnished with top screws and washers, by means of which lubricating material may be supplied to and withdrawn from the apparatus at pleasure.

[Printed, 6d. Drawing.]

A.D. 1858, April 9.—N° 765.

JACKSON, WILLIAM ROBINSON.—"A self-acting railway break."

This invention is of similar character to that for which a Patent was granted to the present patentee on the 31st of July, 1857, in which invention breaks are actuated by springs, which, when at liberty, press them constantly against the wheels, the action of the draw-bar compressing the springs and releasing the breaks when the carriage to which they belong is drawn forward, and the arrangement being such that the same result is produced when the carriage is backed, the breaks being thus prevented from interfering with either the forward or backward movement of the carriage, but being applied to the wheels on the cessation or slackening of the tractive power, and any tendency of the carriages composing a train to overrun each other being thus prevented.

In this invention a "double-acting compensating lever" is substituted for the toggle joint used in the former invention to move the break blocks in opposite directions, this lever being combined with a sliding bar and pushing rods, the present invention being also mentioned as affording a horizontal, compact, and little exposed arrangement of the springs and other parts. Like the former, the present invention is applicable to other than railway vehicles.

[Printed, &c. Drawing.]

A.D. 1858, April 10.—N<sup>o</sup> 776.

OXLEY, JOHN.—"Certain improvements in the doors and sashes of carriages."

This invention relates, in the first place, to the construction of elastic or compressible pads or cushions, mounted in metal frames, and protected by a metal band, case, or cover. Frames so constructed "may be mounted on or fixed to the face or edge of a sliding sash or glass frame, or on the rebate or frame in which they slide, or upon the face of a hanging door or casement, or to the face of the rebate, or pillar frame of a door upon the shutting side, or the top or bottom thereof," the result being that when these pads or cushions are applied to sliding sashes or glass frames, the latter will be thereby prevented from creating the rattle, jar, and other annoyances so frequently experienced in railway carriages and other public vehicles, while, when applied to hanging doors, the shock produced by slamming is avoided, the fastenings of railway and other carriage doors being moreover kept more secure, and the wear of hinges and handles reduced.

Another part of the invention relates to a mode of fitting and working sliding sashes, frames, blinds, and shutters for railway and other carriages, and wherever else such articles may be used. For carriage door sashes or pillars in which the frames slide, the latter work as usual in grooves formed for their reception, but there is also another smaller groove below this for the purpose of receiving a stud or pin, and permitting it to slide up and down therein, there being also let into or fixed on one side of this small groove two or more brass plates, each having "a kind of F slot" therein," and which slot will receive the projecting stud piece of a plate which is fitted to the edge of the sliding sash or frame, so that when the sash or frame has been raised sufficiently to allow of its passing over the fence piece or sill, the horizontal part of the slot will allow of a pin or stud sliding into it out of the small vertical groove or rebate in the pillar or frame, whereupon the stud or pin of each of the plates fitted to the sliding sash will be free to slide down the vertical part of the F slot plate, the result being that the sash, glass frame, blind, or shutter will, as it is pulled or pressed down be carried forward or against the face of the rebate, "and so make a perfectly close fitting joint all round," thereby preventing the access of dust, as also noise and damage from vibration.

Another part of the invention relates to the hinges of doors, especially those of railway and other carriages, and consists in forming a metal socket or cap for the bottom nuckle, there being inserted between the two a vulcanized india-rubber or other elastic washer or flat ring. As the upper end of the metal socket or cap is necessarily of larger diameter than the bottom nuckle, advantage may be taken of this to increase the diameter of the face of the nuckle working above and upon it to the same size. And the introduction of the elastic washer or ring not only prevents jar and vibration, but also compensates for the wear between the metal faces of the nuckle. The details of the invention may be varied.

[Printed, 8d. Drawing.]

A.D. 1858, April 13.—N° 800. (\* \*)

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Im-  
proved means for operating railway brakes."

"This invention relates to a method of applying railway brakes by means of electro-magnets, and attaching the same to the carriages, whereby the power of the magnets is applied in the most direct manner. The mechanism employed is rendered very simple, and facility is afforded for graduating the pressure of the brakes upon the wheels. The brakes are attached to horizontal bars placed before and behind the wheels, and are suspended from centres above the wheels. Electro-magnets are adapted to the break bars by means of links and screw bolts, so as to admit of adjustment when required. The electro-magnets are supported in a horizontal position by means of pendent springs or arms, which will allow them to move a sufficient distance in a horizontal direction to bring the brakes against the peripheries of the wheels. The electro-magnets are connected by means of suitable wires with a battery, and when the circuit is closed they will be attracted towards each other, and will then draw up the brakes against the wheels and retard the carriage."

[Printed, &c. Drawing.]

A.D. 1858, April 14.—N° 807.

OSBORNE, THOMAS, and BELL, ROBERT ALEXANDER.—(*Provisional protection only.*)—"An apparatus for suddenly detaching railway carriages or waggons."

This apparatus consists of "a shaft running under each carriage or waggon (supported by any convenient means), which communicates with levers so contrived as to act in the required manner upon a pin working in a slot in the guide. This pin, when in position, comes under the link of the coupling chain on the draw hook, and in its turn acts upon it." The shaft is worked by a handle, which, when pressed down, causes the pin to ascend in the slot in the guide by means of the aforesaid mechanism, "whereby the link of the chain on the draw hook is pushed off."

[Printed, &c. No Drawings.]

A.D. 1858, April 15.—N° 819.

SPENCE, WILLIAM.—(*A communication from Jacob Conrad Geisendorff.*)—"Improvements in the pedestals and journal boxes of railway carriages."



This invention consists "in the first place, in constructing the pedestal and grease box respectively so as to admit of the latter being easily removed. For this purpose the grease box is furnished with one or more lugs or projections on each side, which are intended to fit into vertical channels or grooves in the pedestal, in the front plate of which are formed grooves through which the lugs or projections of the grease box will pass, and so arranged in relation thereto as to confine the grease box within the pedestal when the latter is down at its bearings, but to admit of its being withdrawn therefrom when the pedestal is slightly raised, so as to bring the lugs or projections on the grease box into a line with the grooves in the front of the pedestal."

Secondly, the invention consists "in actuating the lubricating roller by means of the concussions of the axle. For this purpose the roller is mounted on a small shaft turning on bearings which rest on springs, and are made to press on the lower side of the journal of the axle, so as to regulate the pressure of the lubricating roller against the journal. On the same shaft with the roller is keyed a ratchet wheel, and there are spring palls fixed to a frame on opposite sides of this wheel, so that they may act on the wheel on each side alternately, and thereby impart a slow intermittent rotation to the roller upon each descent and ascent of the latter, caused by a concussion of the axle."

Thirdly, the invention consists "in inserting in the opening through which the axle enters the box, what has been called a 'compensating washer,' for the purpose of closing such opening against the escape of grease or the admission of dust. This washer is by preference composed of wood, but it may be of metal. The upper and lower portions thereof fitting over and under the axle are kept against the same by means of springs above and below; also the central parts thereof have tongues formed on their edges which fit into grooves formed in the outer parts. The washer is made about half an inch narrower than the interior of the box to allow for the play of the axle, and prevent the washer from revolving therewith."

[Printed, 10d. Drawing.]

A.D. 1858, April 17.—No 832.

LUIS, Jozé.—(*A communication.*)—"A new system of window frames for railway carriages."



Although this invention is mentioned in the title and in the Provisional Specification as relating to the "window" frames of railway vehicles, it would seem from the Final Specification to relate to the whole framework of such vehicles. The invention is thus set forth :—

"The modifications which we introduce in the manufacture of framework for railway carriages, tenders, luggage vans, consist in the use of double corner iron plates, whose dimensions and shape varies according to the shafts and cross beams."

"The shafts are fastened together, 1st, at the ends by the cross beams, on which they are held by means of iron squares; 2nd, at different parts of their length by intermediate iron beams with double elbow joints which meet on the shaft, held by iron squares."

"The perfect rigidity of the framework is completed by two elbow-jointed cross bars of iron, fixed below all the intermediate cross beams by bolts or rivets, and which are kept on the end cross beams by means of screws at their ends; these pieces are bent, thus preventing a flexion that the shafts might otherwise have under heavy loads."

"The shafts are strengthened at the parts where the suspension springs end by bars of cast iron."

The invention is mentioned as possessing various advantages over the frames usually employed. The Specification is not accompanied by any Drawings.

[Printed, 4d. No Drawings.]

A.D. 1858, April 17.—N° 838 (\* \*)

BANCROFT, GEORGE WOOD.—(*Provisional protection only.*)—

"Improvements in the construction of certain parts of railway carriages to ensure safety in travelling."

The inventor states that the object of his invention is "the prevention of accidents in railway travelling by ensuring the connecting of the several vehicles of a railway train by providing ready means of communication between the guard, engine driver, and passengers, and by applying peculiarly constructed breaks to each carriage." The apparatus to be employed consists of affixing to the ends of the carriages to be connected a metal box, open at one end, and having at top a cylinder slotted at one side, through which a lever works on a short axis within the cylinder. "The connection between the

“ boxes of two carriages abutting on each other is made by  
 “ placing within the end opening of each box a grooved metal plug,  
 “ such plugs being coupled in pairs by chains of suitable length ;  
 “ the lever is then raised vertical, causing its lower end to enter  
 “ the groove in the plug and prevent its withdrawal. Within  
 “ each carriage, immediately under the roof, and passing out before  
 “ and behind, between small pulleys,” the inventor affixes a  
 “ leather strap,” and supports it by “small hangers,” and  
 attaches to the external end of each strap a “metal spring catch  
 “ capable of quick adjustment,” so as to attach the straps of the  
 several carriages throughout a train, and at each end of the train  
 the alarm may be given by bells or other signals. For the speedy  
 stopping of trains, the inventor supplies each carriage with break  
 blocks, fitting on the top edge of the wheels, and connected in  
 pairs with a horizontal shaft, worked from above by vertical racks,  
 operated by side levers and short racked levers, worked from  
 underneath the carriages by jointed connecting rods, so arranged  
 as to be under the direction of the guard.

[Printed, 4d. No Drawings.]

A.D. 1858, April 22.—N° 893.

STOCKS, JAMES, and KAYE, CHARLES.—(*Provisional protection only.*)—“Improvements in apparatus for coupling and  
 “uncoupling wagons and carriages on railways.”

This invention consists in the construction and employment of  
 “a jointed link, made to fall and engage in the draw hook of the  
 “wagon or carriage to be coupled, and made to rise to free itself  
 “from the draw hook by means of a transverse cranked bar or  
 “shaft extending across the wagon or carriage, and terminating  
 “at each end in a handle or weight. The hook is held up to be  
 “out of the way in loading, &c., by means of weighted or spring  
 “catches. The back part of the link is connected to the crank  
 “of the transverse bar by a stirrup, and the bearings in which the  
 “transverse bar is supported are slotted or lengthened out to allow  
 “play in the bar.” Springs are applied at the joints of the link to  
 prevent the upper part thereof from falling back. “The action  
 “is as follows:—Supposing the jointed link to be held raised up  
 “by the catches, now, in order to couple on to the draw hook of  
 “a wagon or carriage, release the catches by means of a rod com-  
 “municating with them and extending across the wagon, then

" turn over the cranked transverse bar, and engage the link in  
" the draw hook ; then either continue to turn the bar until the  
" stirrup presses down the back part of the link immediately  
" behind the joints, or permit the weight of the back part of the  
" link to cause it to fall or bear down at the joint. A secure  
" coupling will thus have been effected from the outside of the  
" wagon without the necessity of an attendant going between  
" the rails to perform the coupling. The uncoupling is effected  
" also from the outside of the wagon by turning up the trans-  
" verse bar in a contrary direction until the link and bar become  
" held up by the catches."

[Printed, 4/. No Drawings.]

A.D. 1858, May 6.—N<sup>o</sup> 1004.

DAVIS, MARCUS.—"Improvements in carriage wheels, and in  
" means of retarding their motion."

According to this invention wheels for railway purposes are formed "of solid wood," each wheel having a groove in the periphery for the reception of a band of caoutchouc, such groove being curved or inclined at the sides, and having at its lower part a flat bottomed channel, there being also on each side of the wheel rim "metal cheeks or plates" firmly secured thereto, these cheeks or plates forming in fact metallic rings, confining the caoutchouc, and one of these projecting sufficiently beyond the rim to form a flange. The outer portion of the caoutchouc band may be flat, or it may be slightly concave, "so as to fit the surface of the rail" on which the wheel may travel, and it is held in its place around the wheel by its "contractive property."

Other wheels are described, which, however, are apparently meant for use on common roads only. In these the rim or fellow is composed of a number of curved pieces of wood, as usual, these being connected by curved pieces of metal inserted into slits or openings made in the ends of the pieces of wood, and the whole being then rivetted together; a ring or band of caoutchouc or other similar substance surrounding the whole, and being placed in a groove in the outer portion of the rim. Metal cheeks or plates are attached to each side of the rim, in order to strengthen the wheel. If preferred, the groove in the rim may be filled with cork, and this be surrounded by caoutchouc; or cork may be placed in a tube which surrounds the rim; or several tubes or

rollers of caoutchouc may be used; or the groove may be filled with cork, and a metallic tyre driven over such cork, a "springy action" being given to the wheel by "filing across" or otherwise reducing the thickness of the tyre at intervals. The outer ends of the spokes may be inserted into the felloes in the ordinary manner; or a slit may be found in the end of each spoke, and projections from the curved pieces of metal mentioned above may enter such slits, the end of the spoke being surrounded by a metallic "ferule."

The invention includes a skid, which is made "hollow or with a double bottom, with a space between," so as to prevent the part next the caoutchouc from becoming hot. Or a screw or lever may be attached to a convenient part of the carriage to which the wheel belongs, and made to press upon the periphery of the wheel, and so act as a brake when requisite, the part pressing upon the wheel "being provided with a friction roller, so that the wheel may not be injured."

[Printed, 6d. Drawing.]

A.D. 1858, May 27.—N° 1191.

CUIT, CHARLES, and GODEFROY, ALEXANDRE.—(*Provisional protection only.*)—"Improvements in railway brakes."

According to this invention a sort of frame is suspended by chains from the lower part of a railway carriage, this frame being of such form that the wheels work within it, and being capable of being lowered down to the rails, upon which it then travels, being furnished with small wheels adapted for running on the rails. This frame is also provided with small inclines, and in front of these with small wheels or rollers which do not touch the rails, the result of the whole arrangement being that on the frame being lowered, as already mentioned, the wheels of the carriage first mount the inclines and then run upon the small wheels or rollers in front of them, and come into contact with the rollers which support the frame, the object apparently being to cause the latter to be thus prevented from revolving and thus to retard or stop the carriage by their friction on the rails. The frame may be lowered, and again raised when necessary by means of a chain and windlass, a rack, screw, or other suitable mechanism.

[Printed, 6d. Drawing.]



A.D. 1858, June 3.—N° 1252.

**OWEN, ROBERT.**—"Improvements in the manufacture of " railway wheel tyres, and in machinery employed therein."

The first part of this invention relates to the manufacture of tyres of cast steel. An ingot of steel is first cast in a suitable mould, a core being used which causes a slot or opening to be left in the central part of the ingot, which is of oblong form. After being cast, and the core removed, the ingot is heated in a furnace, and is then hammered, "the anvil and hammer being " suitably formed with grooves for the flanges, after which by a " mandril, wedge, or any other suitable means the opening left " by the core, which has become closed by the hammering process, " but not welded, is again opened, and the two halves of the tyre " are forced outwards until they attain the form of a hoop, after " which the hoop may be hammered and then rolled, or it may " be rolled without being hammered, and thus completed. A " part of the ingot is left longer than necessary; this is for the " purpose of the light, spongy, or honeycomb material being cut " off during the hammering process, when the part intended to " form the tyre will be perfectly sound."

Another part of the invention consists "in rolling the tyres " for railway wheels to an uniform inside and outside diameter " by the simultaneous action of inside and outside rolls, whereby " they are rendered true, and boring or turning becomes unne- " cessary;" also "in the employment of more than one outside " and one inside roll made to act simultaneously or otherwise " upon the tyres of railway wheels, and in imparting motion to " both inside and outside rolls simultaneously at one operation." These arrangements are minutely described, but the details thereof will not be clearly understood without the aid of the Drawings annexed to the Specification, and such details may, moreover, be varied. The invention is applicable "to all descriptions of wheel " and other tyres."

[Printed, 1s. 6d. Drawings.]

A.D. 1858, June 4.—N° 1260.

**MERIGHI, VITTORIO.**—(*Provisional protection only.*)—"Means " for impeding and extinguishing fires on railway trains."

This invention consists in providing each railway train with " means of carrying a sufficient quantity of water to any part of " the train, in order either to prevent the outbreak of a fire," impede its progress, or extinguish it altogether. The water reservoir of the tender of the train is provided with a suitable force pump, which may be worked by any suitable means, and water be carried therefrom through hose or other pipes to any required part of the train. " Or, instead of making use of the water of " the tender, one or more of the luggage vans or of the passenger waggon may be provided with a special water reservoir and " force pump, with suitable hose or pipes for conducting the " water at once to the required spot. Instead of pure water, " water mixed with a salt or salts having the property of extinguishing fires " or impeding their progress may be used.

[Printed, &c. No Drawings.]

A.D. 1858, June 4.—N<sup>o</sup> 1261.

JOHNSON, JOHN HENRY.—(*A communication from William B. Fahnestock.*)—"Improvements in railway wheels, and in axle " boxes and bearings for the same."

This invention relates " to a peculiar construction and arrangement of the wheels and axle boxes of railway carriages, whereby " the friction of the flanges against the sides of the rails is " avoided when passing over curves, and the sliding of the wheels " on the inner rail of the curve is prevented."

The improvements consist, firstly, " in so constructing and " arranging the wheels, with their axles and bearings, that each " wheel has the advantage of being on a separate and independent axle, of having a single bearing, and of being self-balancing," the hub or boss of each wheel being outside the tread or rim of the wheel, and the bearing of the axle within the tread or rim, or at the balancing point, each wheel being mounted upon a separate short axle.

Secondly, the improvements consist in a mode of constructing and arranging axle boxes, by which the ends of each separate axle revolve, whilst at the same time they are free to describe the necessary arc of a circle to enable them to adjust themselves individually to the radius of the curves of the rails along which the carriages are passing. The arrangement is such that one end of the axle works in a kind of slot, while the other works in a



brass or bearing capable of turning slightly upon a pivot or centre.

[Printed, 6d. Drawing.]

A.D. 1858, June 8.—N° 1295.

RIGG, ARTHUR, senior, and RIGG, ARTHUR, junior.—“ Improvements in apparatus for tipping or upsetting coals, minerals, or other substances, and in brake machinery.”

This apparatus “ consists of a table or framing mounted on axles, on which framing or table the receptacle or wagon containing the material to be upset is held firmly. On the axle there is a brake wheel surrounded by a band, which is connected to a lever which moves between fixed guides, on which guides there are ratchet teeth into which a click on the lever takes, so that the brake can be left tight in any position,” there being also on the brake wheel “ teeth into which a click enters, so that after the coals or other substances have been upset the moveable parts are prevented from returning until the click is released. The receptacle or wagon containing the material to be upset is placed on the framing or table in such a position that the centre of gravity is beyond the axles, so that when the brake is released the framing and wagon tilt over, and the speed at which they are allowed to tilt is regulated by means of the brake ;” the framing or table being so weighted that when all the coal or other substance has been upset and the click released from the teeth on the brake wheel such table or framing resumes its first position. To the front of the latter, moreover, is fixed a scoop or screen, with or without sides, which receives and guides the coal or other substance as it slides or falls to the spot required, or a scoop or screen may be fixed in front of each receptacle or wagon. Brake apparatus thus constructed is also applicable to other machinery.

[Printed, 10d. Drawings.]

A.D. 1858, June 9.—N° 1302.

GILBEE, WILLIAM ARMAND.—(*A communication.*)—(*Provisional protection only.*)—“ Improvements in the construction of “ railway wheels.”

This invention relates to the construction of “ solid ” railway wheels, and according to one arrangement, the felloe and nave

are first formed separately by ordinary means, stamped wrought-iron plates being employed to connect them, these being placed one against another, so as to strengthen them, and the whole being heated and welded together "by a violent concussion between dies."

According to another arrangement, "before uniting the parts together the nave is forged or prepared in a suitable die, and the wrought-iron plates are placed in and join annular shoulders made on both sides of the nave, and then all the parts are placed between dies," the projecting parts of the nave being afterwards brought down over the wrought-iron plates. The tyre is constructed and placed on the felloe as usual. The wrought-iron plates may be curved, if desirable, "and attached to the nave, to the felloe, or be united together by bolts and rivets," and the welding may be effected "by a forge or pile hammer, or by other suitable means."

[Printed, 4d. No Drawings.]

A.D. 1858, June 9.—N° 1310.

CAMMELL, CHARLES.—"Improvements in railway buffers."

The object of this invention is so to construct the parts of buffers that the springs shall not be liable to be damaged by undue and sudden compression. "To this end the coiled or helical spring of the buffer head is enclosed in a cylindrical case, which is attached either to the end framing or to the buffer head, and is of such a length as will prevent the spring from being collapsed to such an extent as to drive home the several coils against each other. By so constructing the spring case, the end or edge of the latter will, when the buffer is collapsed, be driven against the solid end frame or against the buffer head, as the case may be, and will thereby prevent the coils of the spring from being driven against each other. The same object may be effected by placing a strong rod or cylinder within the coiled spring, and causing the same to work up and down within the spring, or the spring to work thereon. The strong rod or cylinder may be attached either to the end framing or to the buffer head, as may be considered most desirable."

The patentee proposes to sometimes "place between the metallic coils of the spring discs or rings of some soft or yield-

" ing material, which will prevent the coils from being brought  
 " into direct contact, and, if desired, a cushion of some yielding  
 " material may be adapted to receive the pressure of the cylin-  
 " drical case or the inner cylinder or strong rod."

[Printed, 6d. Drawing.]

A.D. 1858, July 2.—N° 1487.

HODGE, PAUL RAPSEY, and SPENCER, GEORGE.—" Im-  
 " provements in the means of preventing or regulating the recoil  
 " of springs used in railway engines, carriages, and station  
 " buffers."

" This invention consists in using " in conjunction with any  
 " kind of buffer spring or springs, whether compound or single,"  
 " an apparatus composed of " a cylinder or cylinders provided with  
 " a piston or plunger, working in a fluid contained in such cylin-  
 " der or cylinders, which piston, when receiving its motion from  
 " the deflection or compression of the springs, displaces the  
 " fluid from one side of the piston to the other along a channel  
 " formed in the side of the cylinder, or by openings or valves in  
 " the piston itself, so that when the whole of the concussion is  
 " taken up by the spring or springs, in either case, the piston,  
 " which is connected with the spring or springs by the piston  
 " rod, having traversed a like distance in the cylinder, and dis-  
 " placed the fluid to the opposite side of the piston by the means  
 " mentioned above, the valve or valves formed in the channel or  
 " channels or piston for that purpose closes and retains the fluid,  
 " thus preventing recoil altogether, if desired, or allowing it  
 " gradually, if required, by providing proper valves or openings,  
 " which may be regulated to any required area, to allow the  
 " fluid to be passed to the other side of the piston by means of  
 " the force accumulated in the spring or springs. The fluid to  
 " be used may be either water, or any combination of alcohol  
 " and water, or any of the hydrocarbon or other fluids, or any of  
 " the animal or vegetable oils." The details of the invention  
 may be varied.

[Printed, 10d. Drawing.]

A.D. 1858, July 8.—N° 1533.

BOOTH, JOHN BILLINGTON, and ASHWORTH, ROBERT.—  
 (*Provisional protection only.*)—" Improvements in the means of

"stopping or retarding the progress or velocity of railway carriages."

This invention consists, in the first place, of a "self-acting break." To the tyre of a carriage wheel is connected a "shell," which is acted upon by a break formed of segments of wood or other material attached to radial arms, such segments being pressed when necessary against the interior of the shell, "the radial arms being governed by a nut and worm wheel and pinion, worm and worm wheel, or spiral spring."

Secondly, the invention consists in giving a "dead stop" to the movement of the wheels of railway vehicles, by placing in the boss of a wheel, or upon its axle, a sliding catch, and upon the guard plate "a sliding plate with ratchet tooth, the position of both catch and tooth being adjusted by cams, so that in one position the wheels may turn either way as desired," the catch and tooth, however, being capable of coming into contact with each other, and so giving "a dead lock to the wheels." On a loose rack secured by a break band and capable of being acted upon by centrifugal catches, may be used, "and also other simple combinations can be based upon the aforesaid principles," and made to operate if desirable in conjunction with apparatus such as that forming the first part of the invention.

Thirdly, the invention relates to a "retarding and controlling arrangement," which consists in placing upon an axle a boss, having a tooth projecting from it, and having around it a loose ring, on the exterior of which is a break band, this band being screwed up so as to give friction to the ring, the retarding action of which is transmitted to the wheels by a sliding tooth acting upon the tooth in the boss on the axle. the sliding tooth being governed by a clutch; thus, when the teeth are not in contact there is no obstruction, but when in contact the break acts and retards the progress of the wheels."

[Printed, 4d. No Drawings.]

A.D. 1858, July 9.—N<sup>o</sup> 1550.

EDWARDS, FREDERICK HOWORTH.—(*Provisional protection only.*)—"Improvements in pneumatic springs for railway carriages and other purposes."

This invention consists "in the use of an air cushion contained within a metallic cylinder, having its inner end closed, such

"cushion being acted upon and compressed by a plunger, of such form as is calculated to restrict the area thereof exposed to unsupported pressure, and to maintain that area invariable during the whole travel of the plunger." The inner or closed end of the cylinder is, by preference, hemispherical, the inner end of the plunger being of similar form, but of smaller radius, the diameter of the plunger being so much smaller than that of the cylinder as to allow the cushion to fold inwards between the plunger and the cylinder when the former is driven inwards, "in such a manner as to support as required the part of the cushion which is under pressure by the condensed air." The plunger may also have a collar upon it, in order to support the fold of the cushion when the pressure within the same is greatest. The envelope of the cushion may be formed of any suitable flexible material, the inventor mentioning, however, as preferable, vulcanized india-rubber combined with canvas. This envelope may be filled with air at the atmospheric pressure, or, if desirable, at a higher pressure, a small quantity of water being also introduced in order to prevent injury to the envelope by the heating of the air when compressed.

[Printed, 4d. No Drawings.]

A.D. 1858, July 14.—No 1590.

**RHEINAUER, JOSEPH.**—(*A communication.*)—"Improvements in the bearings for axles and shafts, in order to lubricate and exclude dust from such bearings."

The lubricating apparatus employed according to this invention consists of "a piece of wood, or lubricating block, contained in an oil vessel under the axle or shaft within the bearing, and the upper surface of the lubricating block is caused to press lightly against the axle or shaft by springs. Over the lubricating block, which is grooved to receive it, a wick of felt or other suitable fabric is laid, and its two ends descend into the oil in the oil vessel, and the oil is sucked up by the wick and applied to the axle or shaft," the bottom of the groove being furrowed to assist in the transmission of oil to every part of the wick. When this lubricating apparatus "is applied to a railway axle, the lubricating block runs parallel to the axle from end to end of the bearing, and is prevented from moving laterally by pins passing up into it from the bottom of the oil vessel." Some-

times, when the lubricating block is long, supplemental wicks are employed, which pass up through the block into the groove formed in it at points intermediate of its two ends, so that the longitudinal wick rests at intervals on these secondary wicks, which replenish it with oil. In order to prevent the escape of oil the joint between the upper and lower parts of the box or bearing is made in an inclined direction. The invention is also described as being applicable to the bearings of mill shafting, a filtering cloth and other apparatus being applied in certain cases.

The apparatus for the exclusion of dust from bearings is mentioned as being more particularly applicable to the bearings of railway carriages, and consists of a ring of felt or other suitable fabric enclosed between two metal rings or discs of slightly larger interior diameter than the ring of felt; this arrangement being attached to the end of the bearing or box, and the axle passing through the rings, so that the interior edge of the ring of felt or other fabric fits closely on to the axle and excludes dust.

[Printed, 10d. Drawings.]

A.D. 1858, July 20.—N° 1631. (\* \*)

SCHMITT, JEAN.—(*Provisional protection only.*)—"Cementing, hardening, and tempering rails for railways, and also axles for railway carriage wheels."

The rails or axles are to be submitted in a furnace to the action of a composition formed of charcoal, grease, hoof-parings, tartar, coarse sugar, rosin, saltpetre, and sand. The tempering must take place after the hardening.

[Printed, 4d. No Drawings.]

A.D. 1858, July 29.—N° 1713.

PARKINSON, GEORGE SEABORN.—"An improved connecting apparatus for working railway breaks, and effecting a communication between railway guards and drivers."

This invention consists, firstly, "of a system of communicating power by tension to the breaks of railway carriages through two or more carriages of a railway train, and in so arranging the apparatus that the slack which would be caused by the working of the buffer rods is obviated, and the extra tension which would be caused by the drawing out of the draw rod is allowed for."



This part of the invention is described under various modifications, cross bars, chains, pulleys, hooks or clips, friction and other rollers, and other mechanism being set forth in profusion. The invention may be applied to carriages and other vehicles provided with buffer rods of the usual character, or to those having one central buffer rod only, or to those which have no buffer rods, in which latter case the patentee proposes to actuate a rod, placed at the side of or under each buffer, by the buffer heads, each rod passing through or under the end beam, and having attached to it a collar carrying a cross bar to which a chain is connected, such chain passing round certain pulleys, and being combined with certain rods and other apparatus by which the breaks are brought into action when requisite, the apparatus of one carriage being connected with that of another by means of screw couplings, and other minor mechanism. In order to compensate for any slight difference in the pressure of the breaks upon the wheels, the patentee proposes to place a layer of some elastic material, or metallic springs, between the break blocks and the iron backs of the same.

In order to afford means of communication between the guard and the engine driver of a train, the tension apparatus may be so arranged as, when brought into operation, to sound a bell, or put into action some other means of giving a signal. And this may be done whether the carriages are or are not supplied with breaks.

[Printed, 1s. 4d. Drawings.]

A.D. 1858, July 30.—N<sup>o</sup> 1723.

SCHIELE, CHRISTIAN, and SCHIELE, FREDERICK.—“Certain improvements in ‘hydro-extractors’ or centrifugal drying machines, and in the method of lubricating their bearings, which method is also applicable to other bearings where lubrication is required.”

In this invention the patentees employ a wire chamber of the usual construction, of wire gauze and of a comparatively small diameter, and also an Archimedean screw or worm inside this chamber, which in revolving turns the wire gauze by the friction of contact, and is so arranged that the chamber “may be retarded somewhat by the feed of the material to be operated upon, or

" by a break, so as to have a less number of revolutions than the " worm, by which means the material (for instance, the sugar " liquor) is propelled from one side to the other continuously, if " it be continuously supplied at the other end." The chamber is worked, by preference, in a horizontal position, and discs are employed to steady the motion of the cylinder, such discs being " comparatively heavy."

The patentees mention that the " continuous and rapid turning " required for this apparatus makes a continuous lubrication of " importance," and that to obtain this they employ tooth, worm, or other gearing to secure the turning of a wheel, which brings up the oil or lubricant to the surfaces to be regulated from a reservoir or oil chamber below. A worm is by preference cut into the spindle in the middle of the bearing or on one of its ends, this worm gearing into the lubricating wheel, and being so cut that its screwing action tends to forward the oil to that end of the bearing which is more difficult to supply. This can also be furthered by an oblique groove in the top bearings, the ends of the spindle bearings being arranged so as to return the oil to the reservoir by known methods. The motion of the lubricating wheel may, if desirable, be made to regulate the feed of the material to the extractor, perfect lubrication of the gearing being thereby secured. Other arrangements of worms, racks, and wheels, and other similar mechanism may be used in place of the arrangement set forth above. And among the modifications of the invention which are set forth is one which is mentioned as being " particularly adapted " to the bearings of railway carriage and other axles," in this case the axle having a worm upon it which drives the lubricating wheel, the latter rotating with one portion dipping into a reservoir of oil, and being pressed up against the axle by spring bearings, and a projecting plate being so arranged as to prevent the oil from passing beyond a certain limit, and a " water surface " being so arranged as to receive any dust which may enter the axle bearing, and so prevent such dust from mingling with the oil. Other modifications of the invention are described as being applicable to " crank pins," the V grooves of planing machines, and other sliding surfaces.

" Differential gearing " is in some cases employed in giving motion to the different parts of the hydro-extractor.

[Printed, 1s. 4d. Drawings.]

A.D. 1858, August 7.—N° 1805.

JOHNSON, JOHN HENRY.—(*A communication from Thomas Hopper.*)—"Improvements in apparatus for working railway breaks."

This invention relates to the working of railway breaks, "whether by manual labour or by the direct action of steam pressure from the locomotive boiler." The break blocks, "which may be suspended in the ordinary manner to the whole or any number of the carriages of a train, are connected to suitable break rods which are disposed longitudinally beneath the carriage framing, and are worked by T-headed levers, with the T piece downwards," the two ends "of the lower arms of the T piece being connected by suitable links with the break rods, whilst the upright cam of the lever is connected with a main actuating rod which extends from end to end of each carriage." These actuating rods are coupled by their ends being "each connected to a stud pin in the under side of an eccentric situate on each end of each carriage. The eccentric is connected by a universal joint with a hanging spindle, which is connected by a similar universal joint immediately below the platform or floor of the carriage to a short vertical shaft working in a fixed bearing in the carriage framing," there being fitted to this shaft "a horizontal lever arm, which extends transversely across the end of the draw bar. Any other mode of connection may, however, be used, which will enable the sliding motion of the draw bar to be imparted to the lever arm, and so partially turn the eccentrics. The contiguous eccentrics of each carriage are connected by suitable eccentric straps, the rods of which are connected by a pin or bolt."

"The suspension of the spindles admits of the eccentrics being pushed sideways when the main actuating rod is moved for the purpose of applying the breaks, and the varying space between each carriage is allowed for by the partial rotation of the eccentrics through the action of the lever arm on the short vertical shaft, in conjunction with the universal joints."

The actuating rods may be moved when necessary by means of screws or hand levers, or by means of a small steam cylinder placed for that purpose "beneath the foot plate of the engine." Should the coupling bolt between any two carriages of the train be accidentally broken the actuating rods of the breaks will prevent

a complete severance of the train at that point, the strain thrown upon the rods then causing them to apply the breaks.

[Printed, 10d. Drawings.]

A.D. 1858, August 9.—N<sup>o</sup> 1809.

**INGRAM, THOMAS.**—"Improvements in means or apparatus for operating railway breaks."

This invention relates to improvements upon the apparatus described in the Specification of the Patent granted to the present patentee on the 20th of August, 1857, and consists,—

"Firstly, in applying a double or compound curved slot to the end of a pendant lever in place of the lever, Figure 4, Sheet "B" of the Drawings annexed to the Specification of the former Patent, either portion of this slot being "capable of acting upon a pin or pulley carried thereby, which also connects together rods whose other ends are connected to the breaks in such manner that when the pendant lever is moved in either direction, the rods are forced into or towards a straight line to operate as a 'toggle joint' to force the break blocks against the wheels." These connecting rods are capable of being adjusted to their proper length by means of screws, "or by a ratchet motion actuated by the block irons."

Secondly, "in connecting the drums, such as represented at (7) Figure 6, Sheet B, of the Drawings referred to, with the centre of the draw bar springs of the carriage at the same place as the draw bar, so as to allow the drum to advance or recede, in order that the connecting wires or chains may be always the same length when the draw bar is drawn out by the weight of the train, or pushed in when the buffers are forced up by the compression of the springs."

The details of the invention are described at some length, but such details may be considerably varied.

[Printed, 1s. 4d. Drawings.]

A.D. 1858, August 12.—N<sup>o</sup> 1835.

**MAISSIAT, JACQUES HENRI MARIE.**—"Improvements in wheels."

This invention relates to the construction of "elastic" wheels, suitable either for railway carriages, or for those used on common roads, as also for "many motive wheels of industrial machines."

The patentee states that there may be "a hundred modes of forming elastic wheels," but that he will be content to describe an arrangement which he has found to be suitable for the purpose, and which he thus sets forth:—"I use a cast metal nave of one piece, or of two pieces contoured having in the direction of the radii surfaces in square and level in a square manner the thin elastic arms of the wheel. These arms are bowed in the direction of the axis, very long, all curved in the same direction, and being fixed at several points with a junction of considerable length, ten inches, each composed of layers of elastic plates, successively condensed to which the springs themselves seem to be pressing, the whole is surrounded with an iron tyre. The number of these plates can be increased to make them wider, longer, or stronger, according to necessity."

"The nave may be modified in a hundred ways to render it solid, light, & elegant at the same time."

The patentee further states that in order to form elastic arms, "either steel or wood may be used, or the combination of metal and wood;" and also that such a combination of metal and wood plates appears to him "so perfect for constructing numerous kinds of springs employed in industry," that he includes such springs in his patent, independent of their application to wheels.

[Printed, &c. Drawing.]

A.D. 1858, August 12.—N<sup>o</sup> 1-12.

**JOBSON, ROBERT.**—"Improvements in apparatus for supplying water to axletree boxes and other journal bearings to lubricate the same."

This invention consists "in combining a water cistern or vessel and an axletree box, or the bearing of a journal, with two water passages or pipes, in such manner that the water may circulate from the axletree or journal to the water vessel, and from the water vessel to the axletree or journal, by which a constant change of water may be kept up. The water vessel may form part of the box or bearing, or be separated and at a distance therefrom."

The patentee mentions that the axletrees or journals, or their boxes or bearings, thus lubricated with water, "have wood surfaces fixed thereto, which, however, is not new," the other



arrangements mentioned constituting the leading features of the invention.

[Printed, 6d. Drawing.]

A.D. 1858, August 20.—N° 1892.

MUNN, WILLIAM AUGUSTUS.—(*Provisional protection only.*)—

“An improved method of constructing railway carriages, where—  
“by greater safety is insured in case of collision.”

According to this invention the body of the carriage is built separately from the platform or bed, on which it rests in grooves, in such manner as to be capable, when a considerable force is applied thereto, of sliding towards either end of such bed or platform.

The principal timbers of the roof of the carriage, running lengthwise, are curved downwards at the ends, and meet and are joined to the ends of the principal timbers of the bottom, which are upwards. These timbers are, moreover, connected by strong pieces of wood, on which are fixed buffers, corresponding with the buffers attached to the bed or platform. The latter rests upon springs “connected with the wheels and axles in the ordinary way.” The buffers are also of the ordinary character, “except that those attached to the body of the carriage have two pieces of metal projecting obliquely behind the pad of the buffer, corresponding with the angle of junction of the timbers at the end of the carriage, to prevent the buffer being driven into the carriage in case of a collision.”

“The object of this arrangement is to diminish the shock in case of a collision, and to lessen the danger to passengers by the breaking of the carriage.”

[Printed, 4d. No Drawings.]

A.D. 1858, August 20.—N° 1894.

HOOD, HENRY.—(*Letters Patent void for want of Final Specification.*)—“Improvements in the manufacture of railway tyre bars, boiler plates, bar iron, and forgings.”

This invention consists, firstly, in the application of Swedish and Russian pig iron in the manufacture of railway tyre bars, such iron being refined, then puddled, and afterwards rolled or otherwise formed into such bars.



The patentee states that there may be "a hundred modes of forming elastic wheels," but that he will be content to describe an arrangement which he has found to be suitable for the purpose, and which he thus sets forth :—" I use a cast metal nave of one piece, or of two pieces connected, having in the direction of the radii mortices to receive and hold in a secure manner the thin elastic arms of the wheel. These arms are broad in the direction of the axis, very long, all curved in the same direction, and being fixed at several points with a junction of considerable length, one felloe, itself composed of layers of elastic plates, conveniently connected, to which the springs themselves assist in constituting; the whole is surrounded with an iron tyre. The number of these plates can be increased to make them wider, longer, or stronger, according to necessity."

"The boss may be modified in a hundred ways to render it solid, light, & elegant at the same time."

The patentee further states that in order to form elastic arms, "either steel or wood may be used, or the combination of metal and wood;" and also that such a combination of metal and wood plates appears to him "so perfect for constituting numerous kinds of springs employed in industry," that he includes such springs in his patent, independent of their application to wheels.

[Printed, 6d. Drawing.]

A.D. 1858, August 12.—N<sup>o</sup> 1842.

JOBSON, ROBERT.—"Improvements in apparatus for supplying water to axletree boxes and other journal bearings to lubricate the same."

This invention consists "in combining a water cistern or vessel and an axletree box, or the bearing of a journal, with two water passages or pipes, in such manner that the water may circulate from the axletree or journal to the water vessel, and from the water vessel to the axletree or journal, by which a constant change of water may be kept up. The water vessel may form part of the box or bearing, or be separated and at a distance therefrom."

The patentee mentions that the axletrees or journals, or their boxes or bearings, thus lubricated with water, "have wood surfaces fixed thereto, which, however, is not new," the other

arrangements mentioned constituting the leading features of the invention.

[Printed, 6d. Drawing.]

A.D. 1858, August 20.—N° 1892.

MUNN, WILLIAM AUGUSTUS.—(*Provisional protection only.*)—

“An improved method of constructing railway carriages, where—  
“by greater safety is insured in case of collision.”

According to this invention the body of the carriage is built separately from the platform or bed, on which it rests in grooves, in such manner as to be capable, when a considerable force is applied thereto, of sliding towards either end of such bed or platform.

The principal timbers of the roof of the carriage, running lengthwise, are curved downwards at the ends, and meet and are joined to the ends of the principal timbers of the bottom, which are upwards. These timbers are, moreover, connected by strong pieces of wood, on which are fixed buffers, corresponding with the buffers attached to the bed or platform. The latter rests upon springs “connected with the wheels and axles in the ordinary way.” The buffers are also of the ordinary character, “except that those attached to the body of the carriage have two pieces of metal projecting obliquely behind the pad of the buffer, corresponding with the angle of junction of the timbers at the end of the carriage, to prevent the buffer being driven into the carriage in case of a collision.”

“The object of this arrangement is to diminish the shock in case of a collision, and to lessen the danger to passengers by the breaking of the carriage.”

[Printed, 4d. No Drawings.]

A.D. 1858, August 20.—N° 1894.

HOOD, HENRY.—(*Letters Patent void for want of Final Specification.*)—“Improvements in the manufacture of railway tyre bars, boiler plates, bar iron, and forgings.”

This invention consists, firstly, in the application of Swedish and Russian pig iron in the manufacture of railway tyre bars, such iron being refined, then puddled, and afterwards rolled or otherwise formed into such bars.

Secondly, in the manufacture of railway tyre bars, boiler plates, bar iron, and forgings from Swedish and Russian pig iron combined with the pig iron manufactured in England, Scotland, and Ireland. "For this purpose a mixture of Swedish and Russian pig iron with one or more of these metals is refined, then "puddled," and afterwards rolled or otherwise formed into the articles mentioned.

[Printed, 4d. No Drawings.]

A.D. 1858, August 24.—No 1921.

BARLOW, HENRY BERNOULLI.—(*A communication from David H. Ziegler.*)—"Improvements in self-acting lubricators."

This invention relates, firstly, to an arrangement whereby a uniform supply of oil or other lubricating material is delivered at intervals to the axle or other article to be lubricated, "so long as it remains in motion," this part of the invention consisting essentially in the employment of two wheels of unequal diameters which are made to rotate in a horizontal direction, one above the other, the upper wheel carrying a glass cylinder containing oil, and the unequal rotation of the wheels (which may be caused to rotate by any suitable means) causing portions of oil to pass from the cylinder through certain openings arranged for the purpose, and thence descend to the axle or article to be lubricated, the whole apparatus being so mounted as to be capable of being fixed upon the bearing of such axle or article. The details of this part of the invention are, however, somewhat complex, and will not be clearly understood without the aid of the Drawing annexed to the Specification.

Secondly, in marking divisions on the glass oil cup or other vessel containing the lubricating material, for the purpose of indicating the consumption of such material.

Thirdly, in an improved mode of constructing lubricators in which the lubricating material is raised from the vessel in which it has been placed, and delivered to the axle to be lubricated by means of endless chains or bands. An inner and an outer oil case are here used, the arrangement being such that the impure oil which has been once used falls back into the outer case, at the bottom of which the impurities settle, while the cleaner part of the oil passes again into the inner case, from which it is again raised to the axle by the endless band or chain which passes over the axle.

Lastly, in supplying an axle with lubricating material by means of a roller (around which a strip of felt or other elastic substance is wound in the form of a thread or spiral) floating in the lubricating material, and in a certain peculiar construction and arrangement of the vessel containing the lubricating material, the latter consisting of a case which is divided by a partition into two parts of unequal size, the larger of which is filled with oil, and contains the lubricating roller, while the smaller part is meant for the reception of the impure oil which descends from the axle, the impurities settling at the bottom of this part of the case, and the cleaner parts passing over the partition into the larger part of the case, ready to be again used. This part of the invention is described as being applied to the axle of a railway carriage.

[Printed, 1s. Drawing.]

A.D. 1858, August 27.—N° 1937. (\* \*)

**GRAHAM-HOPE, DAVID.** — (*Provisional protection only.*)—  
Improvement of locomotive steam engines.

The portion of this invention which relates solely to locomotive engines apply to their "bearing springs." These are usually composed of a series of steel plates piled upon each other, and held together by a pin passing through the centre of each plate, which is thereby weakened in the part where the strain is the greatest by the removal of that portion of metal punched out for the pin. To lessen this defect a cup-shaped projection is forced out of the body of each plate from its under side; this projection being on the under side, or that exposed to compression, gives the plate the same advantage that it would have if it were made much thicker, and it will break anywhere else than through this point previously the weakest. In building the spring, No. 1 plate being cupped, No. 2 plate is cupped in turn, and the projecting part or cup of No. 1 fills the cup in No. 2 plate, and so on until the number of plates are fitted together. The spring then consists of plates lying on each other, the top plate having a recess formed in it, and the bottom plate a projection. A set screw is inserted into a recess in the top plate, by which the spring is prevented from shifting.

The improved construction of piston consists in a wrought or cast iron body, formed solid or not with the piston rod. In a groove sunk into this body a single packing ring, split into two



parts, is placed, which are kept open by two V pieces; these alone are acted on by the steam pressure within the cylinder, and not the whole surface of the ring, as in the ordinary pistons.

[Printed, 4d. No Drawings.]

A.D. 1858, September 1.—N° 1990.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Improvements in springs for carriages and other purposes."

This invention consists "in forming a spring of a pile of steel leaves or plates, each plate of the pile being so bent as to form a series of reversed semi-ellipses. The plates are so piled one upon the other that the convex parts of one plate shall be in contact with the convex parts of its fellow and next adjacent plate, and vice versa, each leaf or plate forming several points of contact for the plate overlying it, and thus disseminating through the pile both the lateral and vertical pressure upon the spring, and making it an exceedingly strong, elastic, and cheap spring, which can be prepared with great facility."

An arrangement is described in which a series of bent leaves or plates are placed between an upper and a lower "bolster," these latter being prevented from moving too far apart by means of a long bolt which passes through the whole apparatus, and "also serves to take up the slack or back lash of the spring." The plates or leaves are not fastened to each other at any of their points of contact, but are free to move upon each other as the spring "gives or reacts," suitable guides being arranged to keep the working parts in due vertical position.

[Printed, 6d. Drawing.]

A.D. 1858, September 2.—N° 1994.

BLEAKLEY, JAMES.—"Improvements in apparatus for communicating between the guard and engine driver of railway trains."

One part of this invention consists in effecting a communication between the guard and the engine driver of a train by means of breaks. The break blocks employed are composed of wood and iron, or other suitable material, one part of each block being so hollowed as to clip the wheel, while the other or lower part is so formed as, when required, to slide upon the rail, the front end, however, being rounded, so as to avoid the effect which might

otherwise arise from its coming into contact with the points of rails, or any other projecting substance. A strong centre shaft extends across the framing of the carriage, to which the apparatus is applied, this shaft carrying arms or levers, to which are jointed or otherwise connected other arms, which are secured to the break blocks, certain suspending rods being connected at one of their ends to the carriage, and at their other ends to the arms last mentioned, so as to act as guides to the break blocks when applied to the wheels and rails, and withdrawn therefrom. On the same shaft is also an arm, at the end of which is a boss or screwed nut, into which is fitted the screwed end of a rod or shaft, at the other end of which is bevil gearing, by which the shaft may be caused to revolve, the revolution of this shaft in one direction causing the breaks to be applied to the wheels and rails, while its revolution in the other direction withdraws them therefrom. Arrangements for turning this shaft may be made, by which the shaft may be actuated from either the inside or the outside of the carriage, and the patentee remarks that in consequence of the great power of these breaks the simultaneous action of the breaks of more than one carriage would give too great a shock or check to the train, this disadvantage being remedied by an arrangement by which the breaks of the different carriages of a train are applied in succession, such arrangement consisting essentially in the employment of various shafts carrying wheels of different diameters. The other parts of the invention do not require notice here.

[Printed, 8d. Drawing.]

A.D. 1858, September 3.—N<sup>o</sup> 1998.

ROBERTSON, JAMES.—“Improvements in driving belts and springs.”

This invention “relates to the application and adaptation of corrugated, undulated, or indented plate or sheet metal to the construction of driving belts and springs, and has for object the obtainment of economy, efficiency, and various other advantages.”

“Corrugated, undulated, or indented metal plates or sheets may be arranged to act as springs in various ways,” the patentee stating that in all the modifications of such springs which are comprehended in this invention, “the spring or elastic action is



" called into play by spreading out or elongating the corrugations, undulations, or indentations, and exhibits itself in contracting or tending to contract them to their original forms. This spreading out or elongation may result from a tensional or pulling strain applied to the spring, or from a compressing strain applied so as to tend to reduce the depth of the corrugations," the various modifications of the improved springs being divided into two classes accordingly.

That part of the invention which relates to springs is set forth at very great length, and illustrated by a large number of figures in the drawings annexed to the Specification, which it will be necessary to examine in order to understand the details of the invention. Various arrangements of springs applicable as bearing springs for common road carriages, and as bearing, buffer, and draw springs for railway carriages are described, the corrugations, undulations, or indentations of the sheets or plates being varied according to circumstances, and in some cases the spring being magnetized, " whereby the resulting attraction between the adjacent corrugations will tend to render the action of the spring more uniform ; such attraction being greatest when the resisting power of the spring is weakest."

That part of the invention which relates to the construction of corrugated metal belts contains nothing which requires notice here.

[Printed, 2s. Drawings.]

A.D. 1858, September 7.—No 2026.

PELLISSIER, LOUIS, and PUYTORAC, JEAN.—"Improvements in railway breaks."

The confused manner in which this invention is described renders it impossible to state with certainty in what the essential features of the invention consist, or, in fact, to give any clear definition of the invention itself. From the Figures in a Drawing annexed to the Specification, however, it would seem that the invention mainly consists in applying break blocks to each side of each wheel of a railway vehicle, such blocks being brought into action when requisite through the medium of an arrangement of levers and rods, which are operated upon so as to apply the breaks by means of a rack and a pinion in gear therewith, which is turned by a hand wheel or other suitable apparatus,

springs being provided for the purpose of releasing the break blocks from the wheels when they are no longer required to act thereon. After setting forth in a very incoherent manner a large number of details which are stated to be suitable for the purpose of the invention, the patentees state that they do not confine themselves thereto, as "many variations may be made therefrom" without departing from the principles or main features of the invention, but in what those "principles or main features" consist is by no means obvious.

[Printed, 8d. Drawing.]

A.D. 1858, September 9.—N° 2044.

TATLOW, JAMES, and HODGKINSON, HENRY.—"Improvements in railway breaks."

In this invention the "break proper, or that which comes into actual contact with the wheel, consists of two parts, one of which is a break block attached to a jointed arm, and extends down nearly to the rail, and the other is a break band that may be divided, if desired, at one, two, or more places, and attached to a metallic band, correspondingly jointed. The arm which carries the break block at one end is jointed at the other end to the carriage frame, and the break band is connected to it near the break block. The other end of the break band is connected to one arm of a bell crank lever, or to any other lever capable of imparting to it such a motion that when the said end is pulled upon, both the break block and the break band may be thereby drawn tightly against the wheel." The patentees mention that they prefer to impart the necessary motion to the bell crank or other levers of any required number of these improved breaks by means of longitudinal rods, arranged, connected, and worked as described in the Specification of the Patent granted to them on the 21st of December, 1857, but that any other suitable method of imparting motion may be employed. They also state that they prefer that the break block and break band shall together be of such a length as to embrace rather more than one-half of the circumference of the wheel. The details of the invention are very clearly set forth.

[Printed, 6d. Drawing.]

A.D. 1858, September 17.—N° 2102.

**HADLEY, CHARLES.** — "Improvements in omnibuses, cabs, " railway carriages, waggon, and other similar vehicles."

This invention consists, in the first place, in constructing railway carriages and other vehicles " with a lower centre of gravity " than hitherto, and of forming a second separate compartment " in the roof of (or underneath) the present carriage;" and in the second place " of modifications of the springs, axles, wheels, and " other parts of carriages."

The details of the invention are described at great length, and under a great variety of modifications. In some cases a carriage is divided not only into two, but into " a double or triple tier or " series of horizontal, lineal, transverse, diagonal, or circular " compartments," with " automatic and other stairs, steps, galleries, and other methods of access to and from them," and modes are described of curving and recessing the side beams of carriages, and forming the floor and other parts of " rivetted or " marine-glued planking or plates," friction or concussion rollers being applied to the sides and angles of or under the body, the axle, cranks, and springs being fixed " within the thickness of " and forming part of the sides."

The invention includes the constructing of railway carriages so as each to contain first, second, and third class passengers' and goods' departments, and engine fuel and attendants' space, each carriage having its own engine or propelling power, and " forming its own train."

Also modes of ventilating carriages by ingress and egress currents; of illuminating carriages, and of painting or staining the door or the body of each department of a carriage of a different colour in order to distinguish the class.

Other parts of the invention include a mode of curving the fore axle so as to allow the crosstree or body of a carriage to " descend " below without coming in contact with the axle;" curving the front axle around the end of the carriage, " thus forming a substitute for the ordinary drawbar;" and a mode of constructing a metallic box nave, having its interior of one or more diameters, with an annular cavity and other arrangements for the purpose of lubrication.

As regards springs, the invention consists in " employing S or " hook, scroll, ringlett, curl, fusee, double spiral, spiral C, double

"C, > (V), > (U), screw, worm, corrugated, serrated, and other sinuous shapes, so as to decrease their length (lineally, but to increase them vertically) and still retain their elasticity, and employing them to act by compression or torsion, or by both." Also of employing, single, double, or treble compound purchase springs, "by means of which the body of the carriage is retained more nearly at a permanent (distance) parallel from the road or rail irrespective of load; and, of fixing such springs between the crank and spokes of the wheel, upon and by means of supplemental dwarf axles within, and radiating from the main axle cranks."

Further, the invention consists in "employing vibrating wheels, and also constructing the wheels with a metallic nave, in such manner that they are attached to the axle cranks direct, without the intervention of an annular collar on and solid with the axle;" and in the use of "tortuous or sinuous spring ends connected direct to the axles, to be substituted in lieu of and to answer for lateral springs." Also in employing "inclined hydraulic or ratchet-wheel vibrating pressure plates in the hollows of carriages to allow the axles to recede within, in lieu of collision with the body when heavily laden," such apparatus being also applicable "for obtaining motive force or pressure from its velocity or momentum, in lieu of employing breaks."

Other parts of the invention consist in "elongating and concaving one of the buffer heads at each end and inverse sides," and employing in connection therewith a certain transverse shaft, certain arms, a draw-bar, with plates, a spring bar, and an "equiradial" bar and wedges, "for alternately lengthening one and shortening the other buffer rod at each end," the arrangement being such that "one set of rods and springs acts for both the buffer rods and draw link; also in employing "a tubular semi-axle upon each end of a solid, central, and inner one," with radius rods to connect, expand, and contract such parts; in so arranging the wheels of vehicles "as to be vibrating in the direction of the vehicle's length during transit; in employing "transcursive" wheels, to vibrate transversely to the vehicle's length; in employing "concentring or vibrating wheels and axles," with an "equiradial wedge bar or other motion for actuating them;" in constructing wheels "with vibrating, concentring, or radiating flanges, to enable them to travel on rail and ordinary ways intermittently or indiscriminately; in form-

ing vehicles with some of their parts hung upon hinges, or pressure plates fixed in situations so that the vehicles or persons passing to or from them shall pass over such apparatus, and employing vulcanite and other tubes, cushions, or pillows under or between them to obtain auxiliary motive force; and in transmitting and applying such motive force to supply and propel carriages along, to move weights to or from carriages, waggons, and other vehicles; "for regulating the fulcrum of the springs, and other similar purposes."

In addition to the particulars mentioned above the invention relates to various others, which, however, appear to be adapted solely to carriages for common roads, and which will be noticed in another series of Abridgments.

[Printed, 2s. 6d. Drawings.]

A.D. 1858, September 25.—N° 2152.

DELACROIX, ARNOUD FÉLIX.—(*Provisional protection only.*)  
—"Improvements in locomotive engines."

One part of this invention relates to "a particular system of brakes, permitting the stopping of a train of carriages without shock at the third or fourth turn of the wheel."

The engine is propelled by means of pushers and catch bars, these acting upon ratchet wheels, and the former driving the engine forward while the latter cause it to move in the retrograde direction, such pushers and catch bars being caused to act alternately as desired. Previous to applying the brakes, the engine driver, by means of a rod or cord, brings into action certain apparatus by means of which the pushers, or catches, whichever may be at the time in action, are raised from their ratchets, the machine being then "free for its proper movement of inertia," one part of this apparatus at the same time disengaging a weighted lever, which, in falling, shuts off the steam, and opens the safety valves. The brakes are applied by means of a chain, which is wound upon the axis of a pulley, which forms a part of the apparatus already mentioned, and to which motion is given by suitable means, the chain then moving a horizontal bar, and causing certain rods connected therewith to move certain levers, these being connected at their lower ends to other levers or bars carrying break blocks. This arrangement extends throughout the whole of the train, the horizontal bar of one carriage being connected



to that of another by means of links and screws, and a long cord, moreover, running the whole length of the train, by which the conductor may if necessary bring the mechanism into action instead of the engine driver; this cord, moreover, being made somewhat longer than the train, so that if any of the last carriages of the train should become separated from the rest, the cord, on being brought into a state of tension, will bring into action the brakes of the whole train.

[Printed, 6d. Drawing.]

A.D. 1858, October 12.—No 2275.

GASSE, JEAN ALEXANDRE. — “Improvements in railway breaks, and in apparatus for working the same.”

This invention consists “in constructing railway breaks and apparatus for working the same in such manner that the breaks may be applied to every carriage throughout a train by means of rods worked from either or both ends of a train, and connected between the adjacent carriages by means of two X levers, which cross each other and are united at the centre by a pin or stud, around which, as a centre, they are free to move. These levers permit of the distances between the carriages being increased or diminished within reasonable limits, without interfering with the action of the breaks. At or near the middle of each the connecting rods are united in pairs to a cross lever which turns about a pin or stud at its centre, and which, upon being drawn in one direction, moves two bars or springs, to the ends of which the break blocks are attached, and thereby presses the blocks against the wheels; while, being drawn in the reverse direction, the lever moves the springs or bars in such manner as to release the break blocks. The rods which work the breaks act in a zig-zag direction throughout the train, that is to say, the motion of the rod, say, on the left side of one carriage, will, through the X lever, communicate motion to the rod on the right side of the next carriage, and so on in succession.”

The X levers of one carriage are connected to those of another by means of rods, the end of one terminating in a cross stud and the corresponding end of the next being provided with a slotted hook which embraces the stud; these parts being three



capable of easy engagement and disengagement in arranging the carriages of a train.

[Printed, 6d. Drawing.]

A.D. 1858, October 13.—N<sup>o</sup> 2284.

BRABY, JAMES, and BRABY, JAMES, junior.—“Improvements  
“in wheels and wheeled carriages, to be propelled by steam,  
“horse, or other power, and in apparatus for retarding the  
“same.”

As regards wheels, the first part of this invention consists “in  
“constructing the wheel in sections, composed of blocks of wood  
“having the grain running all in the same direction, so that  
“when the blocks are all assembled together in the form of a  
“wheel, the grain throughout the whole will be from the centre  
“to the circumference, or parallel to radial lines. The blocks  
“may, if required, be made to abut against a central cast-iron  
“box to receive the axle, or such box may be altogether dispensed  
“with. The blocks must be collected together laterally by straps  
“and rivets, or other suitable contrivances, so as to form one  
“solid mass, with the endway of the grain always presented as a  
“rubbing or wearing surface,” the patentees stating that by thus  
arranging the blocks not only is increased strength and resistance  
to wear obtained, but that there is also no liability of the wheel  
getting out of shape from warping or unequal shrinking. They  
also state that the latter advantage may be obtained “by ar-  
“ranging the blocks of wood in such a manner that the line of  
“the grain may always be parallel to a tangent or chord of the  
“circumference, with the endway of the grain of each block  
“abutting against the endway of the grain of the contiguous  
“blocks.”

Another part of the invention relates to wheels “of a larger  
“diameter than those made solid in the manner above described.”  
The patentees propose, in making such larger wheels, to employ  
metal naves, having sockets made therein to receive the ends of  
wooden spokes. The nave is formed of one piece of cast iron,  
having therein not only sockets for the reception of the ends of  
the spokes, but also chambers or recesses for the reception of oil  
or other lubricating material for the axle; the latter, after being  
*passed* through the nave, being secured by means of a metal  
*washer and* linch pin in the usual manner, or by means of a

screwed nut. At the outer end of the axle a flanged, hollow, hemispherical cap piece or cover is secured to the nave in any convenient manner, and is provided with a hole through which lubricating material may be supplied to the end of the axle when required. This hole is provided with a plug or screw, as usual, and in order to prevent the leakage of the oil an elastic washer is placed between the flanges of the cap piece and the nave.

Another part of the invention relates to an improved mode of mounting wheeled carriages, and of adapting thereto a portable railway, but this part of the invention will be noticed in another series of abridgments. Another improvement in carriages consists in coating or covering the springs of carriages with gutta percha, india-rubber, or some other analogous elastic or flexible waterproof material, for the purpose of preventing moisture from entering between the plates of the springs and causing them to oxydate.

Another part of the invention relates to means of retarding the progress of carriages, and consists "in adapting to some convenient part of the axletree or framing of the carriage, near the nave of the wheel, a drop lever or bar, with a kind of shoe or solid bent up end or crank piece, which will be allowed to act on the periphery of the wheel" upon the falling of such lever; the latter being held out of use, when not required to act, by means of a chain and a hook. Apparatus of this kind may be applied so as to act in retarding the forward motion of vehicles, and also so as to prevent such vehicles from running backwards when "ascending or stopping on a hill or inclined plane."

[Printed, 1s. 2d. Drawings.]

A.D. 1858, October 19.—N° 2335.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"Improvements in the hanging and arranging of cylindrical, conical, or spiral steel railroad springs for railway carriages."

This invention consists "in arranging and operating such springs in groups or series of four or more springs placed in double lines vertically, so as to possess the length of elastic action which two series of the springs would have if placed the one above the other, while the space which they occupy vertically is very much less than they would require if the springs were placed in pairs, one above the other."

In carrying out the invention the springs are arranged in sets of four or more, suspended in brackets or stirrups, or strong iron bars, or grouping levers placed one under the other, and secured at their ends in slots made in the horns which receive or carry the journals or bearings of the running wheels. "The springs may either be arranged in one row (that is to say), one behind the other under the side framing, or they may be arranged in the form of a cross, with the springs at opposite corners bearing on the same bar of the stirrup or bracket."

The invention is illustrated by Drawings in which springs are represented of the kind known as Perry Green Gardiner's conically coiled steel springs, having an open central space or vertical axis; the suspension brackets or bars being adapted particularly thereto, but capable of answering also for cylindrical springs.

[Printed, 1s. 2d. Drawings.]

A.D. 1858, October 21.—N° 2358.

JOHNSON, JOHN HENRY. — (*A communication.*)—"Improve-  
ments in apparatus for lubricating railway axles and other  
bearings."

According to this invention it is proposed to use, "in connection with any convenient or suitable lubricating apparatus or oil elevator, a capillary pad or cushion, composed of wool, cotton, or other suitable material, and combined with a metallic conducting spout, which is pressed by one or more springs against the under side of the enlargement or shoulder of the journal of the axle or shaft. This pad soaks up the excess of oil which always collects at that point, and causes it to return either to the elevator or to the reservoir, so that there will be no waste of oil beyond a few occasional drops. A small piece of wood or leather is fixed in the middle of the spout, and bears or rubs against the shoulder of the axle or other journal for the purpose of taking off a portion of the friction from the capillary pad, which would otherwise become rapidly worn out." The pad should always be placed above the level of the oil in the reservoir, so that it will remain in a comparatively dry state.

Different modifications of the invention are described, in some cases the capillary pad being used in combination with a piece of metal which acts as a "doctor" or scraper; and by using two

such "doctors" the capillary pad may be dispensed with in cases in which the collection of oil is not very extensive.

[Printed, 10d. Drawing.]

A.D. 1858, October 25.—N° 2374.

COTTAM, EDWARD.—(*Provisional protection only.*)—"Improve-  
ments in the internal fittings of carriages."

This invention relates to an improved construction of the seats, backs, and elbow rests of carriages (particularly railway carriages), and consists, in the first place, in the substitution of a peculiar combination of metallic springs, laths, and covers for the ordinary seats and backs, whereby greater elasticity is obtained in such seats and backs, other advantages arising from this part of the invention which are duly set forth. The elastic portion of the seat or back is constructed, in part or otherwise, according to the Specification of the Patent granted to the present inventor on the 16th of June, 1846, such elastic portion being formed by a novel arrangement of springs and their connections, and these in the present invention being covered with leather, horsehair, or other suitable fabric, a sheet of woven cocoa-nut fabric, or other suitable material being interposed between such covering and the foundation, but no stuffing or padding being used; this being set forth as an advantage, especially in tropical climates, although a stuffed cushion may be used in cool seasons or climates.

The second part of the invention consists in forming the arms or elbow rests so as to be capable of being turned up out of the way, leaving the seat available as a couch when requisite. The two parts of the invention may be used either separately or together.

[Printed, 4d. No Drawings.]

A.D. 1858, October 29.—N° 2413.

KIRKAGE, WILLIAM.—"An improved elastic combination of  
materials, impervious to atmospheric influences, as a substitute  
for hard woods, metal, leather, or felting, and for other pur-  
poses."

This invention consists in the manufacture of certain compounds which are applicable to various purposes. The materials constituting these compounds are india-rubber, gutta percha, tar, and sulphur, with certain other ingredients according to the purpose for which the compound is required. The materials employed are



to be masticated so as to form, without the use of any solvent except heat, a fine plastic substance or paste, by the use of masticating apparatus and heat, as is well understood, the india-rubber being first masticated, and the other materials then added to it.

The invention is mentioned as being applicable, among other purposes, "for cushions under springs for railway carriages or locomotives, or for buffers to the same, or for cushions under springs to carriages, gigs, and carts, or for cushions under heavy vehicles when no other springs are used, or for cushions under iron chairs used for supporting iron rails on railways;" the particular composition used for these purposes being formed by mixing 16 lbs. of india-rubber with 25 lbs. of tar, 48 lbs. of finely powdered chalk, 16 lbs. of hemp, and 10 lbs. of sulphur. These substances are first well mixed, and the articles required then formed in moulds, and hardened by being subjected to the action of steam.

[Printed, 4d. No Drawings.]

A.D. 1858, October 29.—N<sup>o</sup> 2416.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—"An improved method of attaching wheels to the axles of railway carriages."

The object of this invention is "to allow to each wheel of a pair a motion on its axle independent of the other wheel, at the same time that the wheels are firmly and securely attached to the axle."

On the axle is firmly secured an auxiliary hub or plate, which has formed in its face, against which the wheel rests, a recessed groove. The wheel, having a tread and flange of the usual form, runs loosely on the axle, and is connected to the plate through the medium of a flanged ring formed of segments, which are placed in the recessed groove, these segments being then secured to the wheel by bolts, which have been previously inserted into the segments, and which pass through the body of the wheel and are drawn up tight by nuts on their outer ends. Thus the segments are free to revolve in the groove whenever the wheel to which they are attached is required to turn independently of the axle, "whilst the wheel is connected with the axle in a secure and reliable manner." The segments may either form a complete ring, "or

" may be of any required number or size to properly support the wheel."

[Printed, 6d. Drawing.]

A.D. 1858, November 1.—N° 2428.

WRIGLEY, FRANCIS.—"An improved self-acting safety coupling for railway and other purposes."

This invention consists "in a combination of joints, links, and pins, so arranged as to form a complete self-acting safety coupling for railway carriages, trucks, rolling stock, and other purposes. The combined parts may be described as consisting of two three-fold joints, with their links, joints, &c., each joint moving on its own centre pin. These joints are attached to the ends of the draw bars of any two railway carriages or trucks intended to be coupled, and may be further described as consisting of, first, the outside joint or jaw attached to and forming part of the draw bar; secondly, of "an internal double joint or link pin;" and, thirdly, of "the centre or coupling link, the whole being so arranged that when so placed in position, and the carriages or trucks brought together in the usual way, the act of coupling is accomplished, thereby entirely doing away with the necessity for a man to place himself between the carriages to couple them, as is at present needful, and consequently removing the cause whereby so many lives have been lost in performing the said operation."

The details of the invention are very fully set forth.

[Printed, 8d. Drawings.]

A.D. 1858, November 2.—N° 2438.

MENNONS, MARC ANTOINE FRANÇOIS.—(*A communication from Claude Arnoux.*)—"An improved system of railway brakes."

The "main feature" of this invention is, "the application of direct pressure to the plane surfaces of the wheels." Two metallic plates are placed on each side of each wheel, such plates being pressed against the wheel through the medium of a longitudinal shaft mounted below the body of the carriage, "or by the screw or lever arrangements in general use." The shaft of one carriage (when shafts are used) is connected with that of another by means of a sliding joint, and thus any motion given to one shaft is communicated to the shafts of all the other



carriages of a train, such motion being given by hand or otherwise.

[Printed, 6d. Drawing.]

A.D. 1858, November 2.—N° 2447.

SAMPSON, JAMES, MACHON, JOHN, and BARTHOLOMEW, JAMES.—(*Provisional protection only.*)—"Improvements in railway carriage brakes."

This invention consists "in placing beneath the end of every carriage an horizontal steam cylinder with an outlet at its upper end;" this outlet communicating with "a pipe running the entire length of the carriages," the portions of pipe between the carriages being made of any known elastic or pliable material. In each cylinder is a piston, the rod of which is connected by means of a link to one end of a bell-crank lever, the latter being so arranged as to be capable of actuating the brake blocks of the carriage on which it is mounted. The pipe communicates with the boiler of the locomotive, and by allowing a supply of steam to enter such pipe, the engine driver can at any time cause the pistons to be so acted upon as to press the brakes upon the wheels of the different carriages, and "the train having come to a standstill the guard can then blow off the steam by a cock at the outlet pipe, and allow the carriages to take a backward motion if necessary."

[Printed, 4d. No Drawings.]

A.D. 1858, November 4.—N° 2461.

OXLEY, JOHN.—"Improvements in carriages and wheel vehicles."

The first part of this invention consists in "constructing a two-wheeled carriage so that it may be used as a close or open carriage at pleasure," the patentee stating that this carriage, unlike a Hansom cab, may be made to carry three persons comfortably, or two persons with luggage, and that the door or doors may be closed by the rider or passenger from within, or by the driver or servant without dismounting for that purpose.

The body of the vehicle is constructed in a somewhat similar manner to that of an ordinary box cab, but with the driver's seat behind, there being introduced between the shackles supporting

the weight of the body upon the springs a cylinder of vulcanized india-rubber or other elastic material, which will mitigate the jar, ring, and noise occasioned by the vehicle passing over stones. A doorway is formed on each side of the carriage in front of the wheels, these doorways being furnished with sliding doors, which when drawn forward close against pillars supporting the front of the vehicle, such front being either flat, circular, or polygonal. The front pillars should be so formed that when the doors are drawn back they will overhang or overlay the thickness of the panel frames or sides of the carriage when the latter is used as an open vehicle. The doors may either slide outside the panels, or the sides of the carriage may be double and the doors work in the spaces between them. The closing and opening of the doors by the driver from behind may be effected either by means of lines and pulleys, by levers, or by any other suitable means, passengers opening and closing them by hand. The cylinders of elastic material mentioned above may be applied in like manner to carts, trucks, and other vehicles, different modes of applying "elastic shackles," and hanging or suspending the bodies of carriages being also set forth.

Another part of the invention relates to the fore carriages and locking or wheel plates of four-wheeled vehicles, and consists in substituting for the apparatus ordinarily used for turning four-wheeled carriages a novel contrivance by means of which a vehicle may be turned within a short space more easily than usual, and may be furnished with higher front wheels.

The apparatus employed consists, in the first place, of two flat iron rings or wheel plates of suitable diameter and strength, each having a bar or transom piece across its diameter, and these plates being connected by a centre pin or perch bolt, this passing through the transom or bed plate and through the opposite bed piece, to which it is secured, there being combined with these plates a slide bar carrying a short bar or connecting piece to which the futchells or the splinter bars are attached, and certain forked and other bolts, loops, and other mechanism being employed in carrying out this part of the invention, the details of which are capable of modification.

That part of the invention which relates to the introduction of an elastic material between the shackles and other bearing parts of carriages is applicable to railway carriages as well as to vehicles for common roads.

[Printed, 1s. 2d. Drawings.]

A.D. 1858, November 20.—N° 2637.

CUIT, CHARLES.—“Improvements in railway brakes.”

According to this invention a brake is so contrived as to act at the same time on the wheels and on the rails, such brake tending to raise the carriage also from the rails. The brake is formed of two hollow beams, between which the wheels rotate, these beams being united by suitable transverse pieces forming together with the beams a frame of four sides, which is suspended by rods or chains from the framework of the carriage, and so arranged that by means of a winch or other mechanical equivalent it may be lowered down upon the rails, and will then travel thereon by means of small flanged rollers or wheels with which it is provided. When the frame thus rests upon the rails “its movement of descent brings a number of inclined planes under the wheels of the carriage, on which the wheels mount, and so suspend or raise the said carriage. These inclined planes are formed, first, of a series of rollers mounted on friction axles, turning on fixed axles in the beams. The carriage suspended thus on the frame will be rolled on the rail, and stops itself immediately without shock. In order to disconnect the carriage from the brake, the brakesman raises the frame to its original position, when the carriage glides down the incline between the beams on to the rails, and can thus recommence travelling.” The patentee mentions that several brake vans or waggons can be placed in the same train, in this case the framing of one brake being connected to that of another “by means of chains of communication, as by jointed rods, which enable a single brakesman to put the whole of the brakes in action at the same time. In case of shock in front, the wheels of the vehicle in mounting on the inclined planes are stopped in their movement, and shock prevented at the same time.”

[Printed, 10d. Drawings.]

A.D. 1858, November 20.—N° 2646.

GARDINER, HEMAN.—“Improvements in the compound axle, hub, and wheel for railroad cars.”

According to this invention that part of the axle which is between the hubs or naves of the wheels is solid, each end, however, being turned down and grooved, a flange or bead being left

at the extremity. To each end of this axle is applied a short axle, or piece, which is also turned down and furnished with a head, which works inside the hub of the wheel, the outer portion of this piece being furnished with a projection which forms the journal of the axle, and this piece and the main axle being united by semi-cylindrical segments, which form a "cylindrical sleeve." The hub of the wheel is composed of three parts or rings, the inner ring being made externally of a partially conical shape, its interior diameter fitting upon a part of the sleeve already mentioned, the second ring covering that part of the sleeve not covered by the first ring, and the third ring consisting of an exterior hub ring, which is connected to the others by screws. These arrangements permit of either wheel revolving independently of the axle when a curve in the line of rails requires it.

Another part of the invention consists in constructing a wheel of two parallel plates of "boiler iron," and so combining the hub with the plates that the latter are let into a mortice between the rings constituting the hub, "while the exterior edges of the plates "are upset, so as to secure and hold the tire very firmly."

And a third part of the invention consists "in adapting a "wheel constructed of a solid hub and in the ordinary manner "to the compound axle" already described, "with the joint "within the hub."

Different modifications of the invention are described.

[Printed, &c. Drawing.]

A.D. 1858, November 29.—N° 2717. (\* \*)

JOHNSON, JOHN HENRY.—(*A communication.*)—"Improvements in locomotive engines."

These improvements are made on locomotive engines that are chiefly intended for running upon steep gradients and sharp curves, and are principally produced by a combination of the axles with an improved construction of the locomotive framing, in which a transverse or lateral play is allowed to the hind axles and wheels, whilst the leading axles and wheels are stationary as regards their lateral motion in their bearings. Eight running wheels may be used, arranged in two pairs between the smoke box and fire-box. The axles of the two leading pairs of wheels are carried on the fixed framing, whilst the axles of the trailing wheels are carried in boxes in internal frames connected by sliding

pivots to the rigid framing. The front axle is the driving axle and has a single crank outside the wheels. The whole of the wheels are coupled by outside cranks and ordinary coupling rods; the eccentrics for working the slide valves are in the centre of the driving axle. A water tank is placed across the barrel of the boiler, another beneath the axle of the trailing wheels; a coke receptacle is carried by the foot plate, and an ordinary tender is added to the whole. Two vertical spring buffers are carried by the tender in such manner that on ascending inclines or running over gradients, a portion of the weight of the engine is transferred to the leading axle of the tender.

[Printed, 10*d.* Drawings.]

A.D. 1858, December 1.—N<sup>o</sup> 2747.

BESSEMER, HENRY. — (*Provisional protection only.*)—"Improvements in railway and other wheels and wheel tyres."

This invention consists, firstly, "in the employment or combination in one wheel or tyre of two or more kinds of iron, or of two or more qualities of steel, or the employment or combination of iron and steel of any desired kind or quality, in the formation of a wheel or wheel tyre by the process of founding," and, secondly, "in the employment or combination of molten iron of any desired kind, or of molten steel of any suitable quality, or of iron and steel with other iron and steel in a heated and wrought or unwrought state in the manufacture of founding wheels and tyres by centrifugal apparatus."

Various modes of carrying out the invention are described, and various advantages arising from the adoption of this invention are specially set forth.

[Printed, 4*d.* No Drawings.]

A.D. 1858, December 1.—N<sup>o</sup> 2751.

BISSELL, LEVI. — "Improvements in trucks for locomotive engines."

This invention relates to an improvement upon the invention for which a Patent was granted to the present patentee on the 5th of May, 1857, in the Specification of which a locomotive engine is described as having a truck with four wheels (or more),

the said truck being so fitted that it "turns laterally of the engine " to accommodate the curvature of the track " or rails on which the engine may be travelling. The present invention consists " in " the application of a rigid truck frame, set and moving on a " fixed centre that is located between the centre of the driving " wheels and the truck wheels," which frame " carries the journal " boxes of said truck wheels, and sustains the forward end of the " locomotive on double inclined bearing blocks resting on double " inclined bearings on said truck frame," the patentee stating that by this arrangement he accomplishes with two truck wheels the objects of the former invention, " where four or more truck " wheels were required."

[Printed, 8d. Drawing.]

A.D. 1858, December 2.—N<sup>o</sup> 2759.

BAILLIE, JOHN.—" Improvements in the construction of rail-  
" way wheels."

Before describing this invention the patentee mentions that the keeping in repair of the wrought-iron or steel tyres of the wheels used on railways is very expensive ; that the manner of attaching tyres to such wheels by " shrinking " and riveting is objectionable ; and that chilled cast-iron wheels are also dangerous " when " cast in one piece," although free from some of the defects of wheels of the other class.

He then describes the present invention as consisting in using a tyre of chilled cast iron, " cast separately (that is, without discs " or spokes)," such tyre being then connected to discs of wrought iron or steel, which serve in place of spokes, these discs " being " formed with lateral projections at their edges, which enter " rebates formed in the sides of the chilled tyre," and the whole being firmly secured together by bolts. The discs may be either flat, solid, or dish-shaped, or with openings in them. " The tyres " of those wheels which are intended to sustain the action of the " brake can be made from wrought iron or steel." The nave may be of cast iron, and a wheel thus formed may have its tyre replaced when worn out " without sacrificing the whole body of " the wheel, as is the case with chilled cast-iron wheels cast in one " piece when their peripheries are worn out."

[Printed, 10d. Drawing.]



A.D. 1858, December 4.—N<sup>o</sup> 2779.

MONNIER, JEAN BAPTISTE ANTOINE. — "Improvements in  
" actuating railway brakes."

According to this invention the apparatus for actuating the brakes is so arranged that "the rotation of the wheels shall, when  
" required, put on the brakes, and also so that the rotation of the  
" wheels shall, if there is more than one brake carriage in the  
" train, transmit the motion to all the brakes." For this purpose there is fixed upon one of the axes of the tender or of one of the carriages an excentric which gives a to-and-fro motion to a rod in which there is a U-formed bend, there being on the end of this rod a weight which constantly tends to make the rod fall, the latter being, however, ordinarily held up by a chain which is attached to a lever similar to a break lever. Below the bend in this rod there is a crank, placed on an axis, which turns in bearings on bars (one of which is on each side of the tender or carriage), and which are supported by the axle boxes of the tender or carriage, there being on each end of this axis three short arms to which rods are jointed, on the ends of which are wooden shoes or blocks. When it is requisite to put on the brakes the brake lever is moved so as to slacken the chain and allow the lever having the U-formed bend to descend, which bend thus embraces the crank on the axis, on which are fixed the arms carrying the wooden shoes or blocks, and, owing to the to-and-fro motion given to the rod by the excentric this axis is caused to make a partial rotation, which causes the wooden shoes or blocks to be pressed against the tyres of the wheels and also against the rails, so as to form a skid, by which means the wheels are prevented from rotating. A wooden shoe or block is placed both in front of and behind the wheel, which carries the excentric, "so as to stop  
" this wheel from rotating when the brake is applied, both when  
" the train is being moved forwards or when it is being  
" backed."

"On each of the carriages on which brakes are placed there is  
" an apparatus similar to that above described, except that the  
" chain holding up the lever with the U-formed bend is actuated  
" in a different manner. On the centre of the axis to which the  
" rods carrying the wooden shoes or blocks are attached there is a  
" quick-threaded screw which gives motion to a nut, on one face  
" of which there is a toothed rack which drives a pinion mounted

“ on an axis which runs longitudinally of the tender or carriage ;  
 “ on the end of this axis there is a plate, having on one side of  
 “ the axis a pin or projection, & on the other side an oval slot.  
 “ On each of the carriages a similar axis is mounted, having  
 “ similar plates fixed on each of its ends, so that when the  
 “ carriages are put together the pin on one plate enters the slot  
 “ in another plate, and so forms a continuous axis throughout  
 “ the train.” The chain which supports the rod having the  
 U-formed bend is fixed to the axis which runs through the train,  
 and in such a manner that when this axis is caused to make a  
 partial revolution the chains of all the carriages having brakes  
 will be slackened, the rods having U-formed bends allowed to fall,  
 and all the brakes of the train be brought into operation. When  
 the rods having the bends are again raised by moving the brake  
 lever the shoes or blocks are brought back to their former position  
 by means of springs.

In order to increase the adhesion of the shoes or blocks to the  
 rails, sand may be allowed to fall from boxes, when required, upon  
 such rails ; or, instead of sand, a mixture of sand and sawdust  
 may be used.

[Printed, 10d. Drawing.]

A.D. 1858, December 6.—N° 2796.

SCALE, EDWARD WATKIN.—(*Provisional protection only.*)—

“ Improvements in railway and other breaks.”

This invention consists in the application of a screw or worm,  
 “ fixed on the axle of the wheel or wheels to be operated on, and  
 “ which may be made to lock the wheels of the adjacent plain  
 “ axles. The axle, or a portion of it, must be enlarged to a conical  
 “ form, and its surface grooved spirally, so as to form a screw  
 “ of a pitch increasing from one end to the other, a lever being  
 “ then placed over the conical screw at right angles to the axle,  
 “ will be carried by rotation from the lesser to the larger spiral,  
 “ and such lever being fastened to a joint at one end, and connected  
 “ in any suitable part with the break blocks will thereby  
 “ cause their pressure, in a proportionate degree, against the  
 “ wheels connected with them. The lever may be made self-  
 “ acting, or be worked by hand ;” and the invention may be applied  
 to various kinds of vehicles and machinery.

[Printed, 4d. No Drawings.]

A.D. 1858, December 15.—Nº 2869.

BRIDGES, HENRY.—“Improvements in the means of working  
“breaks on carriages on railways.”

According to this invention the patentee places under each carriage a “screw shaft,” having “on the screw part thereof a  
“wormed nut,” there being connecting rods attached at one end to this nut, and at the other to a lever or wheel, there being on the screw shaft also a toothed bevil wheel, which works with a similar wheel fixed on a vertical shaft, the result of the arrangement being that when the vertical shaft is turned it will, through the medium of the bevil wheels, cause the screw shaft to revolve,  
“and the nut being restrained from revolving with the screw  
“shaft will traverse or move longitudinally along the screw shaft,  
“and carry with it the connecting rods, and thereby actuate the  
“breaks against the wheels.”

In describing the details of the invention, the patentee says:—  
“I have the screw shaft, near the ends thereof, double or slotted,  
“and I leave a space between the respective cheeks or sides to  
“allow a compensating connection to slide between the said  
“cheeks. I unite this double or slotted part to a socket at the  
“end of the screw shaft, through which the compensating connection slides. I couple or connect the revolving shaft for  
“actuating or working the breaks on one carriage with the  
“revolving shaft which actuates or works the breaks on another  
“carriage by means of coupling shackles or pieces made male  
“and female. I have one end of the female coupling piece  
“formed with a socket, and the other end with a joint, by which  
“it is attached to the compensating connection slide, and on the  
“outside of the socket I have a screw thread. I have also one  
“end of the male coupling piece formed with a joint, and I  
“attach such joint to one of the compensating connection slides,  
“and I have the other end of the male coupling piece made  
“in a shape to fit into the socket, the section of this end  
“and the socket being of such a form that when placed in the  
“socket, and the female coupling piece is made to revolve,  
“the male piece will revolve with it, and vice versâ. In  
“some cases I use a pin or bolt to make one coupling piece  
“turn the other. On the male coupling piece I place a metal  
“nut, which is free to revolve thereon, but which is prevented  
“from coming off by a pin or collar, so that when the end of

“ one coupling piece is inserted in the other, and the nut is  
 “ caused to revolve, as it fits the thread outside the socket of the  
 “ female coupling pieces, the male and female pieces are held  
 “ together. When the compensating slides are caused to revolve  
 “ by means of the screw shaft, and such shaft is coupled or con-  
 “ nected with the compensating slides on another carriage, the  
 “ breaks on the carriages so connected will be actuated or worked  
 “ simultaneously, or nearly so.”

“ In some cases, when it is necessary to provide for six-wheeled  
 “ carriages to work indiscriminately either end forward or toward  
 “ the engine, I place break blocks and screws on the wheels on  
 “ each side of the carriage, so that when the motion is communi-  
 “ cated, the break blocks approach both sides of each of the  
 “ wheels on one side of the carriage, and recede from each side  
 “ of the wheels on the other side of the carriage, one screw shaft  
 “ actuating the levers and blocks on both sides of the carriage at  
 “ the same time. I form a screw shaft with collars at each end,  
 “ and support it in bearings on hangers, and in some cases I form  
 “ such hangers in two parts.”

Different modifications of the invention are described.

[Printed, 10d. Drawings.] : : :

A.D. 1858, December 28.—N<sup>o</sup> 2970.

FAY, CHARLES.—(*Provisional protection only.*)—“ Improve-  
 “ ments in railway carriages and brakes.”

These improvements relate to the railway brake mechanism for  
 which a Patent was granted to the present inventor on or about  
 the 18th of December, 1856, and they consist:—

Firstly, of a self-acting stop motion for regulating the distance  
 to which the brake blocks are removed from the wheels when  
 they are no longer required to act thereon, this being accomplished  
 by means of racks formed inside the vertical column or support  
 within which the shaft for actuating the brakes works. This  
 shaft has a screw thread formed upon it, extending along the  
 greater part of the length of the column; a nut fitted with hinged  
 spring catches or tongues works along the screw, these taking  
 into the teeth of the racks inside the column. When the shaft  
 is turned so as to apply the breaks, the nut is free to descend,  
 but when it is so turned as to release the breaks, the catches or

tongues will only allow the break blocks to be "taken clear off the wheels a certain regulated distance."

Secondly, of a self-acting and self-adjusting reversing apparatus for railway brakes, whereby the latter may be worked indiscriminately from either end of the train without the use of any extra hinges or blocks. This is accomplished "by the employment of durable pushing rods and levers, the latter being keyed on to the transverse rocking shaft, whilst the former are provided at their ends next the levers with racks, into the teeth of which the levers press, and thereby force the blocks or hangers against the wheels in whatever direction the rocking shaft is rotated. The apparatus works either right or left, and reverses itself as required."

Thirdly, of a worm and straight rack motion for the purpose of actuating the brakes of carriages or waggons. This motion is placed under the centre of the longitudinal socket shaft, similar to the worm quadrant referred to in the Specification of the former Patent mentioned above, the worm and rack being enclosed in a box or casing fixed to the under side of the carriage framing, in which box the rack slides longitudinally, the rack being connected by means of a rod with a lever on the transverse rocking shaft, upon which the double levers are keyed.

[Printed, 4d. No Drawings.]

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1859.

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A.D. 1859, January 1.—N<sup>o</sup> 6.

FOOTMAN, WILLIAM.—(*Provisional protection only.*)—"Improvements in breaks for retarding and stopping railway trains, carriages, or other vehicles."

According to this invention there is mounted beneath each railway vehicle composing a train a longitudinal shaft carrying a worm or endless screw, which is in gear with a toothed wheel fixed on a transverse or break shaft, upon which are also two cranks or eccentrics to which the rods of the break blocks are attached. By causing the longitudinal shaft to revolve the worm turns the toothed wheel and moves the break shaft, the cranks or

eccentrics and rods then thrusting the break blocks against the wheels. The longitudinal shaft of one carriage or vehicle is connected to that of another by means of a coupling composed of two tubes, one sliding within the other, and one of these tubes being keyed to the end of the longitudinal shaft of one vehicle, while the other tube is keyed to the shaft of the next, other tubes being connected by pins working in grooves, which cause them to revolve together while allowing endway motion of one tube within the other. The tubes may, if desired, be connected to the longitudinal shafts by "universal joints," or other suitable means. The shafts of all the vehicles composing a train may be caused to turn simultaneously by means of gearing in connection with a vertical or other spindle, which may be worked by hand by the guard or engine driver, or the momentum of the train may be made to cause the shafts to revolve through the medium of friction apparatus connected with one or more of the axles of the tender or of one of the carriages of the train, and which may be brought into action by the guard or engine driver, so as to cause any tendency of the carriages to overrun each other to bring the breaks into action. If it is desired to apply "more break action" to one part of the train than another" this may be accomplished by giving the longitudinal shaft of the carriage forming that part of the train an extra turn or half turn, more or less in advance of the other shafts, "and an index or pointer is sometimes applied" to the break shaft to indicate where and to what extent the "more immediate power is set or applied."

[Printed, 4d. No Drawings.]

A.D. 1859, January 1.—N<sup>o</sup> 12.

GUÉRINOT, PIERRE EMMANUEL. — "Improvements in the  
" application of an apparatus to railway locomotives, waggons,  
" and carriages, for the purpose of lessening the effect of con-  
" cussion in the event of collision."

'This invention consists essentially in an improvement upon the invention for which a Patent was granted to the present patentee on the 28th of January, 1856, and which consisted in placing in front and at the back of locomotives and waggons composing railway trains pointed iron or steel rods, and lead blocks corresponding therewith, the arrangement being such that the pointed rods may penetrate the blocks in the event of a serious collision.



occurring to the train, and the result being that the engine and waggons are prevented from being "jerked back" after the collision, the points, in passing through the blocks, meeting with a progressive resistance sufficient to deaden the shock of the collision, but having no tendency to that reaction which is created by the employment of the springs connected with the buffers ordinarily employed, although such buffers may be used in conjunction with the points and blocks, and the rods of such buffers may be provided with hands which will "smash" similar blocks in the event of a severe collision.

The improvements are described at some length, but the patentee does not limit himself to the "precise modes of application" set forth, nor state particularly in what the improvements upon the former invention consist. In order to understand clearly the difference between the two inventions the Drawings annexed to the Specifications of both Patents must be examined.

[Printed, 1s. 6d. Drawings.]

A.D. 1859, January 1.—N<sup>o</sup> 20.

**BROWN, JOHN, the younger.**—(*Provisional protection only.*)—"Improvements in buffers, draw springs, and bearing springs."

This invention consists in constructing buffers, draw springs, or bearing springs, "each with two or more spiral springs, supported and kept in their proper positions by means of tubes connected together by telescopic joints, so that they may slide within each other, each spring having a separate set of tubes." By these means railway buffers, draw springs, and bearing springs may be constructed so as to have "great extent of play."

[Printed, 4d. No Drawings.]

A.D. 1859, January 4.—N<sup>o</sup> 36.

**DE FOREST, CHARLES.**—(*A communication from Charles Good-year, junior.*)—"An improvement in the manufacture of springs for carriages and other uses."

This invention "relates to an improved mode of applying vulcanized india-rubber or other vulcanized gum, for the purpose of obtaining an elastic bearing suitable mainly for carriage and buffer springs."

The patentee states that hitherto a great objection to the use of vulcanized india-rubber or other elastic gum for springs to light

carriages has been that the material has been too stiff and unyielding for an easy and comfortable spring, although in the case of railway vehicles and other heavy carriages, in which it is necessary to use very heavy masses of the elastic material, it has been successfully used. He then states that by the present invention "a comparatively small piece of the vulcanized gum may be made to yield a greater amount of elasticity with a given weight than a much larger mass as heretofore applied." To attain this end the elastic material "is interposed between the weight to be supported and sustaining levers (which are themselves connected to the carriages, frame, or other bearing surfaces by shackles or pins), or the india-rubber may be placed between the bearing surfaces and the sustaining levers. In either case the varying pressure of the load will bring the levers to bear with more or less force on the india-rubber, and cause the india-rubber at all times to give out the required amount of elastic sustaining power."

Different modifications of the invention may be used, the patentee stating that "this system of applying the sustaining pressure of elastic blocks through levers may be employed for a variety of uses."

[Printed, &c. Drawing.]

A.D. 1859, January 5.—N° 42. (\* \*)

CORFIELD, WILLIAM, the younger.—"Improvements in chains for coupling cranes, cables, mining purposes, hoisting, and all other purposes where chains are used."

The chains are made with double links, so connected as to form two distinct sets, each set forming a perfect chain. If required for a double strain, the links are of equal length: for a single strain, and in situations demanding great security, one set is a little longer than the other, so that the longer may bear the strain, if any of the shorter should break. The patentee also constructs chains "in single or alternate lengths with the usual known methods of single and double parallel links," and joins them to other contrivances that may be required under particular circumstances. This mode of chain making is well adapted for coupling chains, cranes, rigging cables, and buoy chains, mining, colliery, quarry, building, warehouse, railway, shipping, and docks.

purposes, hames, head stalls, harness, and all other useful purposes where metal chains are required.

[Printed, 4d. No Drawings.]

A.D. 1859, January 8.—N° 71.

LYTTLE, WILLIAM A. — (*Provisional protection only.*) —  
 " Taking the place of springs in many if not all of the combinations into which they enter, and also equilibrating a varying force or weight."

In this invention two levers are mounted upon axles, and so arranged that one lever may rest near its end, upon that part of the other which is near its fulcrum. These levers should be made of such shape that in touching one should be either a tangent to the other, or both be curved, and of any required length. " This arrangement of levers may, according to the circumstances in which it is used, be one of any one or several of the orders into which levers are divided with respect to ' power and resistance,' or ' weight and counterpoise,'" the only condition necessary being that when the power applied to one lever exercises its greatest, the resistance of the other exercises its least force. One or both of the levers may be weighted, the weights upon one acting as a counterpoise to the weight of a waggon body (for example), when the levers are made to act as a bearing spring, and the weight upon the other causing a " spring-like resistance" to the motion of the first, when called into action by the inequalities of the ground over which the waggon may be travelling. Or one lever may be pressed against the other by a spring. The invention may be applied, among other purposes, to the buffers of railway carriages.

[Printed, 6d. Drawing.]

A.D. 1859, January 26.—N° 239.

WELLS, JONAS, and CLOUGH, WILLIAM.—(*Provisional protection only.*)—" An improved coupling for railway carriages and " analogous uses."

The chief object of this invention is to enable railway carriages to be coupled and uncoupled without the necessity of persons passing between them. For this purpose the inventors provide each carriage with a link at one end and a crook at the other, and so arranged that upon a number of carriages being brought together

the links and crooks "will connect with facility." The nose or hooked end of the crook is formed with an incline, so that the link of the carriage to be coupled therewith will slide up the incline as the carriages are brought together, and will then drop over the hook and rest upon the bar of the crook, this completing the connection. The crook and link each work upon "a hinge joint formed with a square shoulder to preserve their horizontal position, and they may be applied to the carriages either with or without springs, screws, &c., as may be thought desirable." In order to disconnect the coupling a lever is provided, which is "fixed to the side of the carriage and communicating with the link," and "it is only necessary that the engineman gives a slight reverse motion to enable any man standing at the side to make use of the lever, and the object is attained in a moment." The invention may be applied not only to railway carriages, but also for other purposes.

[Printed, 4d. No Drawings.]

A.D. 1859, February 1.—N<sup>o</sup> 281.

RIGOLIER, LAURENT. — "A new brake for railway carriages."

According to this invention certain "stoppage rings" are placed parallel with the wheels of a railway carriage, these rings not being capable of revolving, but being suspended from the framework of the carriage by means of "ties" consisting of brackets and bolts, the rings being inside the wheels, and capable of sliding to and fro on the bolts, so as to be either pressed against the wheels or withdrawn from them at pleasure. In order to press the rings against the wheels springs are employed, which are so arranged as to tend constantly to produce that effect, but are restrained from doing so by an arrangement of rods and certain cranks or arms connected thereto, the action of these being governed by another rod, which on being drawn in one direction removes the rings from the wheels, in opposition to the action of the springs, being then retained in position by a catch or stop, which on being removed by the brakeman when it is necessary to apply the brakes, allows the springs to at once press the rings against the wheels, the friction of the latter against such wheels then stopping the rotation of the latter. The action of the rings upon the wheels is in this case very sudden, but such action may be rendered

gradual by the employment of an elbow lever, one arm of which is inserted into a slot in the end of the rod worked by the brakeman, the other arm being connected to a screw, having a nut thereon which is outside a fixed bracket which may be turned by hand.

[Printed, col. Drawing.]

A.D. 1859, February 4.—N° 317.

ALLAN, ALEXANDER.—“Improvements in locomotive steam engines, in part applicable for retarding and stopping railway trains.”

This invention consists, in the first place, in “fitting a valve or adjustable obstructing piece to the exhaust or blast pipe of a locomotive steam engine, for the purpose of throttling or stopping the steam issuing from the cylinders, and thereby retarding or stopping the motion of the pistons and driving wheels. In combination with this arrangement, provision is made for using the steam so throttled or obstructed to press brake blocks upon the wheels of the locomotive steam engine, to assist in retarding or stopping the train. The steam is made to act on the brake blocks by means of a small cylinder and piston, and the brake-actuating movements may be extended by suitable coupling arrangements to the tender or other portions of the train.”

The brake apparatus may be modified in various ways, but the patentee states that it is preferred “to place the throttle valve as far from the mouth of the blast pipe as convenient, and where the blast pipe is in two branches (uniting or not in a single mouth piece), a throttle valve may be fitted to each. More than one steam cylinder may be provided for actuating the brakes, and where it is desirable to save as much space as possible the brake cylinder or cylinders may be made to oscillate,” the piston rod or rods in the latter case being connected directly to the lever of the brake shaft; levers, connecting rods, and other mechanism being employed as means of communication in other cases.

[Printed, 10d. Drawing.]

A.D. 1859, February 10.—N° 373.

BURT, HENRY POTTER.—“Improvements in railway carriages and waggons.”

This invention relates to the means of facilitating the moving of "railway carriages and waggons by hand in stations and other places." The patentee applies "to the axle or axles, or to one or more of the wheels of railway carriages or waggons, a wheel and pinion, or a wheel and screw, or a chain wheel and pinion, or a friction wheel and pinion, or a friction pinion acting on the wheel itself of the carriage or waggon, or other similar contrivance for multiplying power," the same being provided with a handle or handles, or hand wheels, or ratchet handles, "by turning or moving which the porters or workmen are enabled to move, or start, or stop the carriage or waggon with facility. When once started the motion may be continued by the same means, or by pushing the carriage in the ordinary manner." The apparatus is so constructed that it may be placed out of gear while the carriage or waggon is being drawn or propelled by the engine, "and may be readily put into gear when it is desired to move the carriage by hand. By this means a carriage may be started and stopped and moved about with great facility by one man."

Different modifications of the invention are set forth with the aid of a Drawing annexed to the Specification, in some cases friction apparatus, and; in other cases, clutches being used to place the mechanism in and out of action.

[Printed, 1s. 4d. Drawings.]

A.D. 1859, February 16.—N° 424.

TOURRIER, JEAN FUREY.—(*Provisional protection only.*)—

"Preventing oscillation of the last carriage of a railway train, and giving rigidity and steadiness throughout the train."

According to this invention "oscillation shall be prevented by placing the action of drawing at the two third back, or thereabouts of the carriage, and a secondary or slight action of drawing at the one-third front, or thereabouts, of the same carriage, the whole connected by chains or rods with the shackles now in use. The rigidity and steadiness shall be obtained by coupling chains, fitting so as to be assistant to the shackles and supporters to the carriage in case of need in unforeseen accidents or casualties."



An arrangement is described in which the framing of a railway vehicle is provided with two cross bars, one of these being placed at about one-third of the length of the frame from the back, and the other at about the same distance from the front of such frame. Behind the bar next the back are springs, to the ends of which chains or rods are attached, these passing forward through openings in other springs placed behind the other bar, but not being united thereto, catches being placed on the chains or rods at a short distance behind these springs, the chains or rods passing onward, and being connected to a horizontal bar mounted inside the front of the frame, and also provided with springs, these latter only coming into action when all the others have being brought into a state of tension by the action of the draw bar, which is apparently meant to be connected to the horizontal bar. The coupling chains mentioned above are merely supplementary chains to those commonly used, but tighter than the latter, the carriage being apparently connected to that in front of it by the ordinary screw link.

[Printed, 6d. Drawing.]

A.D. 1859, February 17.—N° 448.

FAY, CHARLES.—“Improvements in apparatus for working “ railway breaks.”

This invention is described at very considerable length, and under various modifications. The improvements are to a large extent more particularly applicable to the mechanism for which Letters Patent were granted to the present patentee on the 18th of December, 1856, No. 3002, but may be applied otherwise. The details of the invention will only be understood with the aid of the numerous Drawings annexed to the Specification, but the leading features of the invention may be gathered from the following abstract of the claims made by the patentee:—

A peculiar system or mode of actuating the coupled longitudinal break rods of a train, by means of an india-rubber spring in combination with a loose chain drum or pinion carried by the break rod, and coupled therewith by a pall and ratchet wheel.

Making the vertical break rod in two parts, and connecting or disconnecting such parts by a sliding clutch worked by a lever, either through the intervention of a treadle, or of a cord extending along the train.

Certain peculiar systems or modes of compressing the break-actuating springs, and the employment of a self-acting reversing clutch box in connection with the spring-compressing mechanism, whereby the compression of the springs is duly effected whichever way the carriage may be running; also a peculiar arrangement of bell or gong for indicating the due compression of the springs.

The application and use of reversing gear to and in connection with the central break rods, for the purpose of enabling the breaks to act uniformly whichever way the carriage may be turned.

The application and use to and in straight boxes (when racks are used for working the breaks, as described in the Provisional Specification, filed by the present patentee, December 28th, 1858, No. 2970) of anti-friction rollers, which are applied at the sides and ends of the rack boxes to diminish the friction.

The application and use to and in railway break mechanism of an endless screw or worm and worm wheel, so constructed that the screw is capable of being rotated by the worm wheel, and also of imparting motion to such wheel; and the combination with such screw or worm and worm wheel of a sliding clutch for the purpose of releasing the screw or worm from the vertical break rod.

[Printed, 3s. 6d. Drawings.]

A.D. 1859, February 21.—No. 475.

**JOBSON, ROBERT.**—“Improvements in supplying water or other fluid to axletree boxes and other journal bearings, to lubricate the same.”

This invention has for its object improvements in supplying water or other fluid to axletree boxes and other journal bearings for the purpose of lubrication. For this purpose a close vessel for containing the water or other fluid is connected with the axletree box or journal bearing by a suitable tube or tubes, in such manner that when the water or fluid lubricator is at the desired level in the box or bearing, the outlet end of the tube is covered by the water or other fluid.” By these means there will be “no supply of the lubricating fluid from the close vessel into the box or bearing so long as such outlet from the supply tube is closed or covered by the water or other fluid; but so soon as the level of the water or other fluid in the box or bearing descends below the outlet, and air can pass into the close

" vessel, the water or other lubricating fluid will flow into the " box or bearing till the outlet of the tube is again covered." The patentee mentions that in some cases he applies, in combination with apparatus for supplying water or other lubricating fluid, a grease pot or apparatus for containing lubricating grease or composition not in a fluid state, in such manner that in the event of the water or other fluid lubricator, or the apparatus arranged to contain it, not being in action, the supply of grease or lubricating compound may be brought into action to lubricate the axles.

[Printed, 6d. Drawing.]

A.D. 1859, February 21.—N° 477.

JOHNSON, RICHARD WILLIAM, and STABLEFORD, WILLIAM.—" Improvements in axle boxes."

This invention is intended " to facilitate the more ready application of grease, oil, or other lubricating matter to the axle boxes and journals of railway rolling stock, and the protection of the same from dust." The patentees use a " syphon or case," which is inserted into the ordinary grease chamber, there being on the back part of the axle box " a cover or shield with a lubricator, which is supported in position by spiral, bow, or other springs connected to the axle box;" or in some cases they use a " double self-adjusting slide," with a lubricator " supported in position from a staple or slide or from the bottom part of the axle box, and worked by a lever or levers, or with racks and wheels," springs being used with these slides if necessary.

Various modifications of the invention are set forth, and illustrated by Drawings containing a large number of Figures. The " syphon " consists, in effect, of cotton " or other wicking or capillary fibres," which " keeps up a continuous supply of lubricating material to the journal of the axle," a passage being also provided from the reservoir of lubricating material, by which a supply of such material passes to the " boss " of the axle, the latter, as well as the journal, being thus constantly lubricated. The details of the various modifications, however, will only be understood with the aid of the Drawings.

[Printed, 3s Drawings.]

A.D. 1859, February 23.—N° 493.

SCOTT, URIAH. — "Improvements in carriages and various parts of the same, which parts may be applied to vehicles of any description."

One part of this invention consists in "the application of felt, gutta percha, india-rubber, or other suitable material, in combination with metal, in making various parts of carriages." Buffer, bearing, and draw springs for railway as well as other carriages may thus be formed. For instance, a buffer case or cylinder may be about half filled with felt or similar material, a plunger attached to the buffer rod acting on the felt, so as to "prevent or lessen concussion." A spiral steel spring or an india-rubber tensile spring, or a layer of india-rubber and a layer of felt, may be used to bring the plunger out more rapidly than felt alone would do. The patentee states that he constructs an "outside buffer" by taking two or more pieces of india-rubber of any suitable shape, and placing them inside a case or cylinder, so as to form an elastic lining round or partly round the sides, a smaller case or cylinder, formed in segments, being then placed inside the first, and a plunger of tapering or wedge-shaped form, having a buffer head attached thereto, being so arranged that when driven inwards it expands the segments composing the inner cylinder, and forces them against the elastic lining of the cylinder first mentioned. Several modifications of this part of the invention are also described as being applicable for bearing springs; and the patentee further uses "metal sockets and shackles with lugs," having bearings of metal of any shape required, and being lined with felt or india-rubber, or both, or other suitable material, which shackles or bearings "can be applied to the ends of springs, and to isolate the bodies of carriages and framework from each other;"—to isolate the break blocks in railway breaks, and the axle box from the axle guard, "thus isolating with elastic material metal from metal or wood from wood."

The invention also includes a mode of causing carriage steps "to open and shut by the action of the carriage door," this being effected by the use of a bent lever, one end of which is connected to the carriage door and the other to a moveable frame sliding upon guide rods, and by means of which the steps are actuated.

Further, the invention consists in making shafts for carriages of metallic tubes, fitted with felt, gutta percha, or other suitable material.

[Printed, 10d. Drawing.]

A.D. 1859, February 28.—N° 523.

GATWOOD, EDWARD.—“Improvements in buffing, traction, and bearing springs, applicable to railway carriages and locomotive engines.”

These improvements consist, firstly, “in making spiral or conical-shaped steel springs with ribbands of steel, rolled with one edge thicker than the other, so that the coil may wedge and fold one layer within the other, and induce greater resistance by friction.” “The modes of applying these springs as buffers by means of plungers or rods, either in cases or without, are various and well known,” as also “the modes of application as traction springs or to axle boxes,” for which reason the patentee does not describe them. The springs may, “if required, be multiplied in number, either to increase the strength or the length of the stroke.”

A second part of the invention consists in the application of steel rings or hoops of any sectional form to surround the springs mentioned above, “so that the expansion of the spiral spring will be elastically resisted in order to increase the power.”

Although the patentee does not describe in the body of the Specification any particular mode of applying these springs, various applications of such springs to buffer, traction, and bearing purposes are shown in a Drawing annexed to the Specification.

[Printed, 6d. Drawing.]

A.D. 1859, March 1.—N° 537.

CLOAKE, THOMAS.—“Stopping of the bodies and wheels of railway and other carriages.”

This invention consists of “a certain improved apparatus or breaks,” whereby the breaksman, “at the same time that he applies the breaks of the van, also applies them to the wheels of the other carriages of the train, the break surfaces of each carriage being so connected by levers that the motion and force applied becomes a thrust between one wheel and the other, so

“ that the force applied to the one wheel is the support or abutment of the pressure applied to the other.” The force used to work the breaks is applied “ by means of an upright screw and hand wheel, the screw nut of which rises and falls on such screw, and so actuates the horizontal arm of the lever, by which the power is increased and transmitted to the connecting links and levers of the break surfaces. On one of those levers a pin is mounted, which takes the slot of an arm projecting from a horizontal rod carried throughout the length of the carriage, and supported in suitable bearings in which it slides lengthways; the rod of one carriage is connected by a link piece to the rod of the next carriage, and so on throughout the train. The same system of breaks being applied to each carriage, these rods each transmit the motion by the connection before-mentioned to their several break levers, and so apply the whole of the breaks of the train.”

The invention includes an improved coupling for railway carriages. In this coupling the ball lever, the screws connected therewith, and the screw nuts are all arranged as usual, but the nuts are formed on links having bosses at the opposite ends, which receive and permit of the sliding of certain short rods, these being furnished with crossheads inside the links, and shoulders outside the latter, such rods being attached by suitable means to the carriages, the result of the whole arrangement being that “ the coupling connects, screws, and tightens up the carriages like ordinary couplings, but offers obstruction to the approach of the carriages to each other to more than a limited extent, and as permitted by the sliding of the short rods.”

[Printed, &c. Drawing.]

A.D. 1859, March 2.—N° 557.

JOHNSON, JOHN HENRY.—(*A communication from Joseph Vallot.*)—“ Improvements in the construction of grease boxes and bearings generally.”

“ In applying these improvements to railway axle boxes, the junction between the upper and lower halves of the box (when made in two parts) should be always placed above the level of the rubbing surfaces, so as to effectually preclude the escape of the lubricant at the point of junction of the two portions of the box. A constant and regular supply of oil is obtained



“ by using a pulley or roller, the periphery of which is slightly  
“ recessed and filled with felt or other suitable absorbent material,  
“ whilst its interior (if made hollow) may be filled with cotton  
“ waste. This pulley rotates within a trough, which may be  
“ either supported by a blade spring or by a weighted lever, so as  
“ to bear it up constantly, and thereby press the periphery of the  
“ pulley against the under side of the axle journal, which by its  
“ rotation imparts a rotatory motion to the pulley. At the  
“ bottom of the trough, which rests upon a saddle piece on the  
“ spring above referred to, there is a strainer of wire gauze or  
“ other suitable material, and when the lower portion of the axle  
“ box is supplied with oil, the bottom of the trough and lower  
“ portion of the pulley enclosed within it will be immersed  
“ therein, the oil straining itself from impurities by rising up  
“ through the strainer in order to enter the trough.” This ar-  
rangement prevents waste of the oil through being scattered over  
the inner sides of the axle box. “ In order to prevent the oil  
“ escaping at the part where the axle enters the back of the box,  
“ a trumpet-mouth or metallic cone is fitted upon the shoulder  
“ of the journal, the mouth piece of the cone projecting inside the  
“ axle box, so that any oil carried along the journal towards the  
“ back of the box will be arrested by the cone, and will drop  
“ down into the oil reservoir below, to be again strained and ap-  
plied to the journal. A wooden shield, divided vertically down  
“ the centre, and having its two halves held together by a spring,  
“ is fitted on to the shoulder of the axle at the back of the box,  
“ and is maintained in position by being let into recesses or  
“ grooves formed in the sides of the back part of the axle box.  
“ By this means the entrance of dust is effectually prevented.”  
“ When applied to ordinary bearings, the lower brass should  
“ have an opening made therein to allow the lubricating pulley  
“ to bear upon the under surface of the journal.”

[Printed, 10/L. Drawing.]

A.D. 1859, March 7.—N<sup>o</sup> 592.

PALMER, WILLIAM.—“ An improved railway carriage break,  
“ and coupling apparatus connected therewith.”

Before describing this invention the patentee mentions that  
“ heretofore railway carriage breaks have been placed on one  
“ carriage only in each railway train,” whereas according to this

invention "each carriage in a railway train carries its own apparatus, and each wheel can be locked by means of a friction wheel or pulley, so that a long train may be stopped in as short a time as a short train."

The apparatus employed "consists of friction drums or pulleys, and hinged straps (which allow for the deflection of the vehicle when loaded) and two slide bars or rods to each carriage. These bars or rods, when coupled together throughout the length of the train or part thereof, form two slide bars or rods the length of the same. The first or last carriage in a train carries the usual guard's break wheel, to which one of the slide bars or rods is connected by a chain or wheel attached to it, and a drum or wheel at the lower end of the break wheel. If there are two guards' breaks required to the train, the wheel of one guard's break is attached to one of the slide rods, the second rod being attached to the other break wheel. The connections at the ends of the slide bars or rods of each carriage, when properly adjusted, allow of one of the bars being wound up by either guard independently of the other, and they are so constructed that the train may be backed or shunted without interfering with the action of the break bars and straps."

"The arrangement is intended as a substitute for the breaks usually employed on railway carriages." The details of the invention include the use of universal joints, to "allow for any ordinary play or vibration of the carriages," and also the employment of "three-square" barrels or tubes as means of connecting one slide rod with another, and these being so arranged "as to give and take according to the length of the buffers," a change in the distance between one carriage and another thus not interfering with the action of the break apparatus.

[Printed, 1s. Drawings.]

A.D. 1859, March 7.—N° 596.

AIMONT, PIERRE ERNEST.—"Improvements in the construction of waggons and other carriages for railways and ordinary roads, and of apparatus connected therewith."

This invention consists, firstly, in constructing waggons and other carriages "in such manner that should the wheels of the same pass over inclined or irregular ground, or round a curve, the body of the waggon or other carriage will, nevertheless,

"continue vertical." This is effected by "suspending the body of the carriage or waggon upon springs from transverse shafts by means of jointed suspending rods or plates, and by mounting the said transverse shafts upon suitable wheels by means of upright jointed arms or frames, which are jointed to the said shaft at their upper ends, and carry the axles of the wheels at their lower ends."

The patentee states that he prefers these upright arms to be forked at their lower ends, "so as to embrace the wheel and receive both ends of its axle, and with their inner sides free to slide up and down in grooves formed to receive them in the side of the carriage," and that he also prefers to "form the rails with an upright tongue to take into the grooves of the wheels, so as to keep the wheels always upright," provision being also made for allowing the wheels to accommodate themselves to curves in the road by moving laterally.

The invention consists, secondly, in forming rails with an upright tongue, as already mentioned, and with the bottom sloping upwards from the middle towards both sides, so that wedges may be conveniently placed under the rails as may be required to support them and keep them upright. The successive lengths of rail are jointed together by links, which allow of their conforming themselves to curves and irregularities of the ground," both rails and wedges being bolted down by suitable spikes.

Thirdly, the invention consists in forming an instrument with a plumb weight or similar weight to indicate the middle of the track, and with upright arms and transverse bars so combined as to determine the gauge of the way as the rails are laid down.

Fourthly, the invention consists in adapting these improvements to ordinary railways by mounting ordinary railway wheels in the manner already set forth, and laying down a single line of rails of the kind already mentioned in the middle of the railway, and fitting the carriages with central double-flanged wheels which are pressed down upon the rails by springs, and aid in preventing the carriages from leaving the line.

[Printed, &c. Drawing.]

A.D. 1859, March 11.—N<sup>o</sup> 628.

WASHBURN, NATHAN.—"A new and useful or improved machine for rolling tires for wheels."

This invention consists in "a combination of a set of reducing rollers, a series of adjustable carrying rollers (or their equivalents), and a frame or holder thereof (that is, of the carrying rollers), supported so as to be capable of rising upward within the wheel tire in proportion as the diameter of the inner periphery of the said tire may increase during the process of rolling the tire, the said carrying rollers being arranged and made adjustable with respect to their holder and the reducing rollers," the special object of the invention being "not only to reduce a tire in thickness by rollers, but at the same time to impart to it a true circular form on its inner periphery, as well as to smooth and even such periphery."

The rollers which work within the tire are gradually pressed outwards from the centre of such tire by means of screws and toothed wheels, all these rollers being carried by a frame or holder which is raised by means of a chain and weight as the tire increases in size. The "reducing rollers" act upon both the outside of the tire and the inside, the outer roller working in stationary bearings, while those of the inner roller are moveable.

The patentee states that this invention "has been found to operate to great advantage in the manufacture of tires for railway wheels."

[Printed, 6d. Drawing.]

A.D. 1859, March 16.—N<sup>o</sup> 655. (\* \*)

DIXON, JOHN, and CLAYTON, ROBERT.—Rolling iron and steel for railway wheels.

It is desirable to make that part of the bar which forms the felloe or rim of the wheel wider than the spokes or arms, but this is not to be accomplished by the ordinary method of rolling iron. The improved process consists in first rolling bars that are parallel in width, but of unequal thickness, the part required to form the rim being thicker than the part required for the spokes; the bars thus rolled are cut off to the required length, and then passed sideways through another pair of rolls which widens the thicker part forming the rim, and leaves that part forming the spoke untouched. To taper the spoke sideways, the rolls are made to act slightly on the thinner parts to widen them also. The bar is passed twice through the second rolls in contrary directions that the lateral expansion may be effected evenly. In applying the method to wheels with wrought-iron bosses the angular ends

of the bars are expanded laterally, making them of the required width before the washers are welded on to complete the boss.

The improvements are applicable to making the ends of steam-engine connecting rods.

[Printed, 10d. Drawing.]

A.D. 1859, March 21.—N° 707. (\* \*)

HAGGETT, WILLIAM.—This invention consists in giving to iron and other materials, by rolling, pressing, or casting, an undulated surface, composed of longitudinal and transverse corrugations, crossing each other at right angles, or diagonally at such other angles as may be most advantageous for the purpose to which the prepared article is to be applied. This method of increasing strength is applicable to "all metals, wood, cardboard, "paper mâché, clay, and all other materials capable of being "rolled, pressed, cast, or moulded;" and the materials so strengthened are applicable, either separately or in combination, to a great variety of purposes, amongst others to ship and boat building and sheathing, railway and tramroad works, canal locks and aqueducts, railway and other carriages and engines, steam and other boilers, hydraulic and other works, tanks, cisterns, pipes, chain cables and other chains, &c.

[Printed, 6d. Drawing.]

A.D. 1859, March 22.—N° 724.

PITMAN, JOHN TALBOT.—(*A communication from John J. Fields.*)—"Improvements in springs for railroad cars and for other "purposes."

This invention consists, firstly, "in forming the elastic substance "composing the spring into a single hollow cone, or series of "cones fitting one within the other, for the purpose of presenting "more surface in proportion to the quantity of material than "when used solid, and thereby to develope more elasticity and "create greater resistance and action than by other forms of "construction." springs thus formed being used in combination with "single or combined metallic housings" in which they are enclosed, and an internal "coniform plunger or cone plug."

Secondly, the invention relates to the mode of constructing the "metallic housing" already mentioned. The main and lower portion of this consists of a vessel somewhat resembling a bell



with the mouth upwards, and this may be used either alone or in conjunction with a second or upper piece, the spring in this case being between them, and the two being so adjusted "that by the weight or pressure" on the spring "they may come together or overlap, and thus form a complete metallic housing." The plunger also may be either solid or compound, and the result of the arrangement is that the weight or force applied to the spring "bears regularly throughout the whole elastic surface employed, vertically, laterally, and obliquely, diffusing throughout the elastic volume any force or strain acting thereon."

[Printed, &c. Drawing.]

A.D. 1859, April 4.—N° 842.

NEWTON, WILLIAM EDWARD.—(*A communication from Augustin Castellir.*)—(*Provisional protection only.*)—"An improved construction of retarding apparatus or break for railway carriages."

The object of this invention is to bring the retarding apparatus of railway carriages into progressive action by means of mechanism which can be brought into play with facility by a single man, "who will be enabled to produce a certain and determined action which will be transmitted simultaneously to all the carriages in the train."

The retarding apparatus, which operates on the wheels of the carriages, is actuated by suitable gearing connected with one of the axles of such wheels, this gearing being brought into operation "by means of a clutch box which is under the control of the guard, and may be put into or out of gear by him by means of a screw shaft and lever," and the gearing is arranged in such a manner that it may be driven in either direction by simply moving a sleeve shaft on which a part of the gearing is mounted.

[Printed, &c. No Drawings.]

A.D. 1859, April 6.—N° 862.

OWEN, WILLIAM.—(*Partly a communication from Robert Owen.*)—"Improvements in the manufacture of railway wheels and tyres, and in the apparatus employed therein."

This invention is described at some length. It consists, firstly, in a mode of combining the felloes and the tyres or other parts of railway wheels, by forming a dovetailed or other like opening



in the tyre or other of the two parts to be combined, and forcing into this opening the heated end of a rivet or bolt, or the heated end or edge of a bar or plate, in such manner that the metal shall be expanded in the said opening and thereby be caused to hold the parts firmly together.

Secondly, in a mode of constructing railway wheels, "by forming the felloe with parts of different radii, and locking the same in a tyre formed with an internal locking groove."

Thirdly, in constructing railway wheels by forming any two or more parts thereof separately, heating any two or more of them separately, and then bringing them together in a heated state to be acted upon by dies, "and thereby welded into one."

Fourthly, in various modes of forming the naves, spokes, and tyres of railway wheels; this part of the invention consisting essentially in heating all or a portion of the parts of which the wheel is to be composed and uniting them by the use of "hammer dies." Different methods of effecting this object are described, this part of the invention including the casing or covering of those parts which do not require to be heated, in cases in which the whole are not united simultaneously, with some fire-resisting material, this preventing waste of such parts by unnecessary heating.

Another part of the invention consists in the employment and use of a double furnace, or of two combined furnaces, for facilitating the heating of any two or more parts of a wheel which it would be difficult to heat simultaneously otherwise.

The invention further includes a method of forming dies for welding the parts of railway wheels with moveable portions, furnished with springs and catches to keep them in their proper position while the welding is proceeding, but which may be moved to facilitate the introduction of the parts to be operated upon. Also a mode of forming a tyre for a railway wheel from a bar of wrought iron or puddled steel, hammered into a suitable form in transverse section, the files being first so arranged that there shall be a portion prevented from welding, so that when the bar is drawn out the unwelded portions may be separated, and the whole opened out to form the tyre. Also a mode of using up waste materials, such as wrought iron turnings and other pieces, "by forcing such pieces into suitably formed dies, and then heating and working them up into railway wheels or parts of railway wheels" by suitable means.

[Printed, 3s. 6d. Drawings.]

A.D. 1859, April 13.—N° 931.

GILBEE, WILLIAM ARMAND.—(*A communication from M. Tenting, ainc.*) — (*Provisional protection only.*) — “Improvements in the construction of the axles of railway and other carriages.”

The object of this invention is “to render the two wheels of the same axle independent, or able to turn independently of each other, according to requirements;” and the invention consists in the employment, in addition to the ordinary axle, of a second hollow axle, “serving as an envelope to the former. One of the wheels is fixed on the hollow axle, and the other on the ordinary axle, the hollow axle being bored internally so as to permit the ordinary axle, which is suitably turned in a lathe, to play within it freely. The hollow axle extends from the external part of the nave of the wheel fixed to it to the interior of the nave of the wheel adapted to the ordinary axle; its length may, however, be modified according to requirement. The ordinary axle supports the weight of the carriage.”

[Printed, 4d. No Drawings.]

A.D. 1859, April 14.—N° 938.

BEATTIE, JOSEPH.—“Improvements in the means of preventing locomotive engines and carriages in motion on railways leaving or running off the rails.”

The patentee mentions in the first place that railway engines and carriages are frequently caused to leave the rails from two circumstances, viz., from the jerking or other irregular action of the wheels of such engines or carriages occurring after the breaking of an axle, or the jerking or irregular action of such wheels during or soon after the descent of an incline on the railway. He then states that the object of the invention is to prevent such results, which is accomplished “by having a suitably-formed ring of metal cast or affixed in one or more pieces to the inside of the boss of each wheel,” there being on the axle of each wheel a ring of metal with a lip or turned-up edge, so placed or affixed that such turned-up lip or edge will come between the turned-down edge and the boss of the wheel, so that if the axle break between such turned-up edge and the boss, the lips or edges will preserve it in a horizontal position, or nearly so, and pre-

serve the engine or carriages on the line of rail, there being, moreover, in some cases an additional or check rail parallel with the ordinary rails at convenient positions on inclines or curves, and other suitable parts of the line of rails, such check rail being fixed in a channel or groove in the chairs of the railway, or in a chair formed for the purpose, or otherwise suitably arranged.

The details of the invention are described under different modifications.

[Printed, 10d. Drawing.]

A.D. 1859, April 14.—N° 940.

BARNES, WILLIAM, PICKERING, SAMUEL, and ROBERTS, JOHN.—(*Provisional protection only.*)—"Improvements in retarding and stopping railway locomotives and trains."

This invention consists "in the application of an additional cylinder on one or both sides of the engine," the piston rod or rods of which may be connected "by a suitable rod to the same, or it may be to other crank pins on the driving wheel or axle, or to the engine cranks."

"The piston rod of the second cylinder is fitted so as to slide through its piston, but has a stop on it, with an elastic packing or buffer, which confines it to the rod, and prevents contact with the bottom end of the cylinder."

"This cylinder is placed in communication with the boiler by a steam pipe and suitable cocks or valves and connecting gear," so that while the steam is turned off from the engine it is admitted to this second cylinder between the cover and the piston. "The steam so admitted produces an elastic obstruction to the further rotation of the driving wheels, and thus tends to prevent the further rotation of the driving wheels, or the wheels with which such cylinder may be placed in communication, and so retards and ultimately stops the train," suitable eduction pipes being also provided, and the eduction being controlled in a suitable manner by valves or cocks.

[Printed, 4d. No Drawings.]

A.D. 1859, April 15.—N° 947.

GILBEE, WILLIAM ARMAND.—(*A communication from M. Tenting, ainc.*)—(*Provisional protection only.*)—"Improvements

" in the construction of buffers for railway and other carriages, " also applicable to other purposes where springs are employed."

This invention consists in employing compressed air or other suitable fluid enclosed in a bag or receptacle formed of india-rubber or other suitable elastic material, such receptacle being surrounded by a moveable metallic ring or envelope, placed, when applied to a buffer, within the buffer cylinder, and acted upon by a piston or plunger attached to the buffer head. "The bag or " receptacle assumes a lenticular form under the pressure of the " air or gas introduced into it, so as to permit the material composing the bag, after being submitted to shock or pressure, to " recoil, and to recover its primitive position. The dimensions " and form of the bag may be varied according to the application " or purpose for which it is employed," and similar arrangements may be applied to the traction and suspension springs of railway carriages.

[Printed, 4d. No Drawings.]

A.D. 1859, April 26.—N° 1046.

MAIN, ROBERT.—"Improvements in wheels for carriages."

This invention consist in the first place in the construction of wheels in such manner as to be adapted for running either on ordinary ground or on tramways or railways, without the necessity of any apparatus requiring to be brought into action by the driver or attendant on the carriage. There is a space formed in the felloe of the wheel, in which are inserted segmental links connected together by pins, "and forming together a kind of " chain all round the wheel. The inner side of this chain rests " against springs fixed in the inner part of the felloe, and the " outer part of the chain is thus made to project beyond the " tyre and form a projecting ring or flange on the circumference " of the wheel, so as to be capable of holding and guiding the " wheel on a tram or rail. Instead of a ring or flange in segments, a continuous ring may be inserted in the hollow space " of the felloe, which, by the pressure of the springs on its inner " circumference, will be made to project in a similar manner " beyond the tyre when the wheel has passed from ordinary " ground on to a tram or rail. By this construction of the wheel, " also, the weight of the carriage to which it is applied will be " caused to press the flange inwards against the springs, so as to



" admit of the wheels of the carriage running with the required  
" smoothness on ordinary ground. The springs are covered and  
" protected by a face plate. Wheels thus constructed will be self-  
" acting by the mere effect of the ground or surface on which the  
" wheels rest either being made to press the elastic ring or flange  
" inwards to a level with the tyre, or allowing the same to be pro-  
" jected by the springs beyond the edge of the tram or rail on  
" which the tyre rests."

In the second place this invention consists in the construction of wheels intended to run on ordinary ground, with elastic projections on their circumference. For this purpose a hollow space is formed, as before, in the felloe of the wheel, in which springs are inserted, and there are projecting pieces inserted through spaces in the tyre at intervals in such a manner as to rest against the springs. " By this construction of the wheel the projections  
" around its circumference will be capable of yielding to the  
" unequal pressure of the ground. In this case also the springs are covered and protected by the face plate."

[Printed, *8d.* Drawing.]

A.D. 1859, May 6.—N<sup>o</sup> 1137.

KELLINGLEY, WILLIAM.—" Improvements in the mode of  
" lubricating the journals of the axles of locomotive engines, of  
" carriages, and machinery."

In this invention the patentee uses what he calls a lubricating shield, which is fixed by preference on the axle, at the inner end of the journal. " This shield is so formed that while it prevents  
" the escape of the lubricating matter at the axle it throws up  
" such lubricating matter into a receptacle from which it is con-  
" ducted to any part of the bearing intended to receive the  
" lubricating matter." The lubricating shield is formed of brass, or any other suitable metal or material, such as gutta percha, hard india-rubber, known as vulcanite, or any material which will stand  
" the action of the oil."

" The lubricating shield consists of a thin circular flat plate,  
" having a boss on one side, grooved round to catch any oil that  
" may happen to get over the shield plate. On the other or inner  
" side projecting arms are formed, so as to bring the oil up to the  
" top into the receptacle mentioned above. Some of the arms are  
" connected at the periphery of the shield plate by a continuation

" of the arms, so as to form close recesses, so that the oil in these  
" shall not be discharged into the receptacle, but will run down  
" on to the top of the axle."

The patentee states that he places the lubricating shield on the inner end of the journal, but that it may be applied at the middle of the journal, as in Briggs' Patent. He states, however, that if placed at the centre it would not act as a shield, but merely as a lubricator, and the arms might then be on both sides of the plate. Proper chambers are provided in the axle box, below the axle, to receive and retain the oil or other lubricant, and into which the lower part of the shield dips, so that in revolving the oil shall be brought up to the receptacle before mentioned.

[Printed, 10d. Drawing.]

A.D. 1859, May 17.—N° 1223.

**BROWN, JOHN, the younger.**—"Improvements in buffers, draw springs, and bearing springs."

This invention consists in constructing railway buffers, draw springs, or bearing springs, "each with two or more spiral springs, " supported and kept in their proper positions by means of tubes " connected together by telescopic joints, so that they may slide " within each other, each spring having a separate set of tubes," the patentee stating that by these means buffers, draw springs, and bearing springs may be constructed which will have "great " extent of play."

A mode of carrying out the invention is described in which seven spiral springs are used, one of which forms a central spring, and is of larger size than the other six, the latter being placed at equal distances around the central spring, and each being kept in its proper position by a tube, within which a second tube or a rod slides, this arrangement being applicable alike to buffer, bearing, and draw springs.

[Printed, 10d. Drawing.]

A.D. 1859, June 7.—N° 1386. (\* \*)

**CORNISH, KENNETH HENRY.**—(*Provisional protection only.*)—

" The objects of this invention are to manufacture bedsteads with  
" greater simplicity and economy than hitherto, and to give in-  
" creased elasticity to the bed," by means of laths which are  
arched or curved upwards, instead of straight. This arrangement



is applicable to couches, sofas, litters, settees, chairs, and other seats and reclining surfaces; also to the seats of railway carriages, steamboats, and ships.

[Printed, 6d. Drawing.]

A.D. 1859, June 18.—N° 1475.

AERTS, PAUL FRANÇOIS.—“Improved apparatus for lubricating railway rolling stock, and the moving parts of machinery.”

One part of this invention consists in applying to a railway axle, or other shaft, a disc provided with cavities or buckets, these dipping, as the disc rotates with the axle or shaft, into a suitable reservoir of lubricating material, and raising and discharging a constant supply of such material upon the journal of such axle or shaft. If necessary, tubes or pipes may be applied in combination with the cavities or buckets, and, in the case of axles more particularly, the disc is furnished with cavities or buckets pointing alternately in opposite directions, thus providing means of lubricating the axle when revolving in either direction. With these arrangements either water or other liquid may be used for lubricating.

Another part of the invention consists in certain arrangements by which the axle-boxes of railway rolling stock are rendered “practically water-tight.” According to one arrangement a washer of cork (by preference) is used, such washer being formed in two parts which may be pressed into close contact with the axles by screws. In another arrangement a small wheel, “of conical form,” is connected to the axle and revolves therewith, this wheel so acting that the lubricating fluid “is constantly diverted or rejected from the only point from whence it could escape,” an elastic or semi-elastic washer being used in combination with this wheel. In another arrangement a metal cap, with a certain plate and a “cap leather,” are made to answer the same purpose; the invention also including a “keyed stopper for the purpose of withdrawing the foul water or other fluid from the axle-boxes of railway stock.”

[Printed, 10d. Drawing.]

A.D. 1859, June 18.—N° 1476.

RANSLEY, JAMES.—(*Provisional protection only*).—“An improved brake for retarding railway and other carriages.”

"To the body of the carriage, immediately under its back end, is fixed a lever, one end of which projects in a horizontal line, the other in a vertical line, and has secured to it a break block either of metal only, or metal lined with wood. It will appear evident that as the guard or conductor places his foot upon a plate on the end of the horizontal or bell-crank lever, his weight will force the break block against the periphery of the hinder wheel at the back part thereof, and effectually prevent the revolution of the same."

The invention is applicable not only to railway carriages, but to carriages for common roads also.

[Printed, 4d. No Drawings.]

A.D. 1859, July 4.—N° 1591. (\* \*)

BROOMAN, RICHARD ARCHIBALD,—(*A communication from Job Johnson.*)—Powder or mixture for refining and steelifying iron. According to this invention, take quick or caustic lime, free from earthy or foreign substances, and add to it an equal quantity of bone dust or baked bones finely divided, and a like quantity of charcoal; mix these ingredients intimately, and expose them to the influence of the weather for one, two, or more days; then take any convenient form of cementing or converting furnace, and interstratify the articles of iron to be operated upon with the mixture till the furnace is charged; afterwards close and lute with fire clay, and apply heat externally. "By this means and process I am enabled to give to iron entirely new properties and qualities, as well as to convert or partially convert it into steel at pleasure. Iron, subjected to this treatment, assumes great rigidity and hardness without losing its property of malleability and ductility. Shafting, piston rods, axles, journals, and such like, may be hardened and strengthened by an exterior coating of steel, possessing all the properties of cast steel, whilst the interior retains all its fibrous structure. In like manner, railway bars, wheels, chains, anchors, anvils, and large articles generally may be hardened and strengthened to any required extent, whilst smaller articles" "may be finished in iron, and then converted, or partially converted, into steel, without impairing their forms or requiring reconstruction. This process also gives to iron the property of resisting oxidation in a high degree, and amongst other things is most important in its

" application in preparing plates for shipbuilding, boilers, bridges,  
" and other like purposes."

[Printed, 4d. No Drawings.]

A.D. 1859, July 6.—N° 1602.

LUIS, JOZÉ.—(*A communication from Duplay, Vidal, Lachaise, & Co.*)—" An improved mode of manufacture of wheel tires for rail-  
" way carriages and engines."

According to this invention a tire is formed of "two bands or  
" strips, one of iron and the other of steel." The band of iron is  
grooved or concave, while the band of steel is convex in form.  
The patentee states that the steel band "is only sufficient in size  
" to complete the exterior of the tire," and that "in order to give  
" it the necessary length a band of iron of the same form and size  
" is welded to it," so that when the two first-named bands are  
rolled together, "the interior of the metal hoop or tire is entirely  
" of iron, and the outer circumference entirely of steel."

The bands are so prepared as to be "wedge-shaped at each end."  
and, after being rolled into the form of a circle, have the ends  
united by a pile hammer while in a mould or matrix. And the  
tyre is then further rolled and finished by the use of rolling  
apparatus in which hydraulic pressure is used to compress the tire  
between two cylinders, other rollers serving "to guide and keep  
" the tire in its place during the operation."

[Printed, 1s. 4d. Drawings.]

A.D. 1859, July 6.—N° 1606. (\* \*)

LLOYD, SAMPSON,—"*Improvements in the manufacture of cast*  
" steel tyres." A cast steel ingot is taken hot from the mould,  
and hammered in a suitable die, so as to form a rib or flange  
upon it. The ingot is reheated, and rolled into the section of the  
tyre required. The ends are bent round and joined, welded, or  
molten steel is run between them, and hydraulic pressure is  
applied, or the two ends are dipped in a bath of molten steel.  
Or the tyres may be cast in a continuous ring or circle, an elastic  
core being used to allow for the shrinking of the metal when  
cooling.

[Printed, 6d. Drawing.]

A.D. 1859, July 12.—N° 1652. (\* \*)

LUIS, JOZÉ.—(*A communication from Bernard Joachim La Mothe.*)—"Improvements in railway car seats and arm chairs." The back of the chair is made moveable, "so as to take a position more or less sloping" at the will of the occupant. Any material may be employed in the construction, and the back, seat, and arms may be stuffed or not. The arms and the legs are united by "a strong wooden or metal fastening," and a groove or slide furnished with a roller "is firmly attached at a proper height on each side of the chair to the frame or legs." Two metal elliptical springs slide in the grooves; they are united "at a distance conformable to the desired width of the seat" by a piece of "sheet iron, wire gauze, wood, or other substance, which serves as the seat." The back "is fastened to the arms or frame of the chair in such a manner as to be subject to the movement of the seat," and by attaching it "to the chair by means of a moveable iron rod or bar on each side having their support on the arms," it can be made "to act on either side of the seat." A foot rest may be connected with the seat and be kept under it when not in use; "it can be made to advance either by means of springs or otherwise." The rollers may be dispensed with; the seat may be made "to move in a simple slide" instead of on springs; and the seat or back or both may be secured in any position by a catch.

[Printed, 8d. Drawing.]

A.D. 1859, July 12.—N° 1654.

WRIGHT, THOMAS.—"Improvements in the permanent way of railways, and in the means of preventing railway accidents thereon."

One part of this invention consists of a "cast iron bed plate sleeper," which is composed of a rectangular casting, "with the addition of a safety curb or rail projecting above the ordinary rails upon which the engine runs," these being combined with this safety curb a "life guard." This guard "is attached to the framing of the engine and carriages, and descends to within a short distance of the top of the safety curb, over and within which it travels. On a break down occurring, or a train running off the rails, these guards and curbs support and con-

"fine the engine and train to the rails. This guard may be used, if thought desirable, upon any ordinary railway, in which case it would bear upon the rail itself, or upon an auxiliary rail laid for that purpose."

These "life guards" are described under different modifications, being in some cases made to act also as skids, in which cases they are forced down upon the rails by screws; being composed of a transverse bar, the ends of which are guided in slots in vertical brackets bolted to the engine or carriage framing, and carrying iron shoes to which are secured wooden blocks. The other parts of the invention do not require notice here.

[Printed, 1s. 6d. Drawings.]

A.D. 1859, July 12.—N<sup>o</sup> 1655.

WHITE, GEORGE.—(*Provisional protection only.*)—"Improvements in apparatus for counteracting the effects of collisions in railway trains."

This invention relates, firstly, to "a means whereby the weight of the carriage bodies is exerted in resisting the force" of the shocks arising from collisions. For this purpose levers are mounted on fulcrums, fixed to the bearing springs of the carriages, and inclined at an angle of  $45^{\circ}$ , such lever being connected by a short link to the frame of the carriage, the link being jointed thereto and to the lever at some little distance from the fulcrum, so as to form a kind of toggle. "The free end of the lever is in position," and the buffer rod so furnished that when driven in to a certain distance it takes effect upon the lever, and so carries it to nearly an upright position, by which movement the lever and link assume a greater angle, or a straight line, thereby raising the carriage frame and body from the bearing springs to a greater or lesser extent, and thus causing the weight to offer resistance to the compression of the buffers, and this before they come home and in contact with the framework. The buffer and lever are so arranged that with ordinary pressure they take no effect thereon. This apparatus may, of course, be modified to suit the different constructions of carriages. In order to prevent the sudden reaction of the resisting force, each buffer and coupling rod has attached to it the piston rod of a piston working in a cylinder enclosing water or other fluid, which moves easily in one direction, but is moved with difficulty in the other direction, this

effect being produced by a suitable adjustment of the passages connected with the cylinder, and through which the fluid is forced on the movement of the piston. "The cylinders are so connected " that the fluid restricts the reaction of the buffer springs and the " weight of the carriages, which are permitted to resume their " normal positions only at the uniform and regulated rate determined by the resistance of the fluid."

Another mode of carrying out the invention consists in the employment of a "collapsible carriage," containing a cylinder or cylinders having a piston or pistons therein, and such cylinder or cylinders containing fluid, and having passages arranged as mentioned above, the piston or pistons being attached to one part of the collapsible carriage, and the cylinder or cylinders to the other, the result being that the collapsing of the carriage is opposed by the piston or pistons. The collapsible carriage may be placed either in the rear or in the front of a train, so that in case of the collision of such train with another such carriage will break the shock of the collision. Instead of cylinders containing pistons and a fluid, springs may be used; and a carriage may be so constructed as to "offer resistance in expanding, which may be useful when the " hinder part of a train is retarded from any cause." The sudden reaction of the buffer or coupling rods may be prevented by applying clicks to catch them whenever they have passed a certain point, and they may be relieved by the stroke of a hammer, or similar means.

[Printed, &c. No Drawings.]

A.D. 1859, July 20.—N° 1706.

GRADWELL, WILLIAM JAMES, and GRADWELL, DAVID.—*(Provisional protection only.)*—"Certain improvements in bearings " or journals employed in machinery, which improvements are " also applicable to the bearings of railway and other wheels and " axles."

The object of this invention is to diminish the friction of railway and other axles in their boxes, as well as that of other surfaces which come into frictional contact. "The improvements " consist in a novel and peculiar arrangement of antifriction " bowls or rollers for the said purpose," any required number of which are arranged around the axle, and revolve loosely in two supporting discs or framings, and are enclosed within a cylindrical



box which forms a bearing for the whole, so that the axle bears and revolves upon the bowls or rollers, the latter revolving around and with the axle (by contact) and bearing upon the interior surface of the cylindrical bearing or box; the friction between the axle and bearing being greatly reduced by the interposition of the bowls, "which partake of the two motions, round their own axes, and also round the shaft."

The invention may be modified "by employing one disc or frame in the centre, and grooving the bowls in the middle of their length to allow them to fit into the said circular frame." The invention may be applied not only to axles and shafts which have a rotary motion, but also to "sliding surfaces," such as those (for example) of planing machines.

[Printed, 4d. No Drawings.]

A.D. 1859, July 26.—N° 1736.

MICKLES, PHILO D.—(*A communication from Dunforth Johnson*).—"An improved spring for railroad and other carriages, and for other uses and applications where springs are required."

The distinguishing feature or character of this invention consists "in producing a spring which is circular in form, and generally endless or of a continuous piece, and which is composed or made up of one or more levers arranged or laid upon each other, and to which power or pressure is applied from within to elongate it, and which has all the elasticity and quickness of vibration of the elliptic spring, with greatly increased power, united with lightness of material, cheapness of construction, and great durability."

The spring may be formed of flat steel "coiled or wound upon itself in a circular form or shape, a greater or less number of times according to the power or strength required," the ends being properly secured, and there being placed within the spring two bearing blocks, the ends of which act against the spring in opposite directions. "One of these pressure or bearing blocks is to be attached to the running gear of a carriage, or to the fixed part of anything to which the spring is to be applied, and the other connects with the body of the carriage, or with the thing which is to be acted upon by the spring."

The patentee states that by "applying the pressure from within to elongate the spring instead of from without, the sustaining power of the spring is vastly increased."

[Printed, 10d. Drawings.]

A.D. 1859, August 2.—1783.

ASHWELL, JAMES CHARLES.—(*Provisional protection only.*)—

“Improvements in wheels for railway and other carriages.”

This invention consists “in the application of antifriction or auxiliary wheels to railway and other carriages. Instead of the ground wheel running loose upon the axle, as usual, the wheel and axle may be firmly united, the antifriction or auxiliary wheels may be affixed to the springs of the carriage, and the whole attached to the frame thereof, when the antifriction wheels will rest on the fixed axle, or they may rest on the ground of the box wheel where a loose axle is used, the result being that a considerable increase in the leverage of the wheels is obtained, together with a great reduction of friction.”

[Printed, 4d. No Drawings.]

A.D. 1859, August 6.—N° 1818.

DELANNOY, ALBERT FRANÇOIS.—“Improvements in lubricating the axles or journals of wheels, also applicable to lubricating apparatus for the transmission of motion in general.”

This invention relates more particularly to the lubrication of the axles of railway as well as other carriages. An arrangement is described in which an axle box is fitted to a wheel which rotates on the journal of the axle. The oil box is fastened by means of a screw to the end of the journal, and is provided with an upper opening which is usually kept closed by means of a valve or stopper actuated by a spring, but which valve or stopper may be opened by means of a lever, the oil box being also provided with a lower opening, furnished with a screw plug or stopper, for the purpose of discharging material therefrom when needful. The oil box is below the axle, and the oil proceeds from the box to the axle through the medium of “wicks,” these latter, by the aid of capillary attraction, supplying oil to pieces of felt, through the medium of which it is communicated to the axle, stuffing boxes being applied to prevent the ingress of dirt or other foreign matters into the oil box, and also preventing the escape of oil therefrom.

The details of the invention are very fully described, springs connected to diaphragms or partitions being used to keep the felt in contact with the journal of the axle, the patentee stating that to apply the oil box to the rotating axles of railway carriages it is

necessary to form the journal without the ordinary collar or cap at the end thereof, "by which means the axle is enabled to work " independently of its grease box," and less resistance is given to the " tractive power."

An important feature of this invention consists in "the bearing " being made to completely surround the journal," the latter being thus enabled "to resist the alternate rocking motion of the " axle, which is so disagreeable to passengers and so injurious to " railway plant."

[Printed, 8d. Drawing.]

A.D. 1859, August 8.—N° 1821.

WESTON, JOSEPH.—(*Provisional protection only.*)—"Improve-  
" ments in breaks for railway carriages, and in the method of  
" applying the same, and in conveying signals from one part to  
" another of the same train, parts of which are applicable to  
" breaks for other purposes."

As regards breaks these improvements "consist principally  
" of suitable shoes, mounted one at each end of a lever vibrating  
" on a fulcrum midway between the two wheels, the extreme  
" length of the lever and shoes being rather more than the dis-  
" tance between the peripheries of the said wheels, so that as the  
" lever is made to approach a horizontal position between the  
" wheels, the shoes become jammed by the rotation of the  
" wheels, and thus act as breaks to the latter."

"The breaks are connected together and made self-acting by  
" the draw bars or buffer rods, and are applied by the drag of the  
" van or last carriage, which has to be breaked by hand in the  
" usual or any other manner; or the breaks may be applied by  
" the momentum of the carriages when the ordinary break is  
" applied to the engine."

Another method of connecting the breaks together is by means  
of rods running the whole length of the train, and furnished  
with suitable joints, in which case these rods may be made avail-  
able for the transmission of signals from one part of the train to  
another.

The shoes are each mounted upon a short lever, which is con-  
nected to the vibrating lever by a hinge joint, the latter being  
capable of bending only in one direction, and that only when con-  
siderable force is applied, such movement being opposed by a

strong spring ; consequently the whole break is rigid when being jammed in one direction, but gives way and bends at the joints when being withdrawn. The break is provided with a quadrant and ratchet worked by catches on the wheel, so as to prevent the break from jamming too suddenly, or so tightly as entirely to prevent the revolution of the wheels.

The draw bar springs are connected together by tie rods, and the vibrating break lever is connected by a vertical lever (keyed on the same axis) to the draw bar or to the buffer rods, so that upon putting the break on the van or last carriage, or on the engine, the draw bars or buffers will immediately put the breaks on the rest of the carriages.

" On starting the engine it will pull forward the draw bars and release the buffers, and thus bring the breaks out of action.

[Printed, 4d. No Drawings.]

A.D. 1859, August 11.—N° 1858.

BOUCH, WILLIAM.—"Improvements in breaks, in buffers, and " in couplings to be used on railways."

One main feature of this invention consists in the employment of one moveable buffer head "instead of two at each end of a " carriage, and in fixing the buffing spring at one end while the " other end is free to move under the action of the buffer," the buffer at one end of the carriage being fixed "on the opposite " side to that on the other end."

As regards the couplings of railway carriages, the invention consists in an arrangement "by which the first link of a coupling " chain is made to compensate for any inequality of length in the " two coupling chains," this part of the invention being carried out by the employment of rings provided with certain moveable pieces, the hooks of the coupling chains being inserted into such moveable pieces. And as regards breaks, the invention consists in fitting cranks to the moveable break blocks of railway vehicles, such cranks being made to operate upon the break blocks through the medium of an ordinary lever attached to a rocking bar, a short lever on the same bar, and a connecting rod.

[Printed, 1s. Drawings.]

A.D. 1859, August 19.—N° 1904.

**SALMON, PETER.**—"Improvements in locomotives, and in " apparatus for warming trains of carriages connected thereto."

One part of this invention consists in the adaptation to locomotive engines of certain modes of using the steam "not only at " high pressure but also expansively, heating the feed water for " the boiler, and returning the heated air in the tubes of the " same," this object being accomplished by the use of additional or expansion cylinders and force pumps, with a heating chamber or chambers forming a continuance of the smoke box. Another part of the invention consists in conveying steam from an exhaust pipe or boiler to the several carriages of a railway train by means of jointed or flexible pipes and branches disposed so as to distribute the heat over the interior of the carriages. These matters, however, do not belong to the present series of abridgments. The patentee mentions, however, that the system of pipes forming the second part of the invention "may be used for communicating with the breaks of the several carriages in a train," although he does not set forth any special application of the system to that purpose, the main features of the system being the employment of a pipe connected to each carriage through which steam or hot water may pass from the boiler of the engine, the pipe of each carriage being formed with a socket at one end, and the several pipes being brought together with their respective carriages, and united by the front end of one pipe passing into the socket in the pipe in front of it; flexible portions of pipe in some cases uniting the main pipe of one carriage with that of another.

[Printed, 10d. Drawing.]

A.D. 1859, August 19.—N° 1906.

**BOULT, SWINTON.**—(*Provisional protection only.*)—"Improvements in the means of or apparatus for retarding railway " carriages."

This invention relates "to a novel mode of working the " breaks, which are intended to be brought against the peripheries of the running wheels." "The breaks are arranged "in pairs," so as to "act simultaneously on both sides of all the



"wheels," and to this end "the break arms are jointed like a pair of shears, and the upper ends of the arms are connected in any convenient manner to the buffer rods, so that when these latter are driven back they shall act on the arms and cause the surfaces of the breaks to bear against the peripheries of the wheels."

[Printed, &c. No Drawings.]

A.D. 1859, August 22.—N° 1910.

GREGORY, JOHN.—"Improvements in locomotive and other steam engines."

The first part of this invention consists in constructing locomotive engines "with four steam cylinders and eight wheels, mounted upon four axles placed parallel with each other," the two additional cylinders being connected with the coupled driving wheels by means of rods, "which may be detached or disconnected for permitting two cylinders only being used," the additional steam cylinders being placed at the opposite end of the engine framing to that at which the cylinders are ordinarily placed. The patentee states that by increasing the length of the framing of ordinary six-wheel engines having four wheels coupled, and adding an additional pair of wheels as trailing wheels, he is enabled to increase the capacity of the boiler and steam generating surfaces, and that by disposing the additional pair of steam cylinders behind the trailing wheels, relatively in the same position as that in which the cylinders are ordinarily placed at the smoke-box end, he is enabled to connect the piston rod ends or cross heads by means of connecting rods, with the outside cranks or pins of the driving wheels. He removes the flanges from the four driving wheels, or constructs them without flanges, and states that by increasing the length of the engine base by the addition of a fourth pair of wheels, he is enabled to obtain a much steadier, safer, and powerful engine, "as the additional power of the extra pair of cylinders can be transmitted through the four coupled driving wheels, whilst the removal of the flanges enables curves of shorter radius to be travelled."

Another part of the invention relates to the axle boxes of locomotive engines and carriages, and consists in a novel contrivance for permitting the assumption of radial positions by the axles in traversing sharp curves without undue straining of the frames or



the iron plates, or injury to the axle bearings or boxes, or to the wheel tyres, or to the metals. It consists in constructing axle boxes with a suitable vertical recess on each side, "and so forming the horn plate or guiding frame in which each axle box slides vertically, that its edge, being rounded or otherwise formed to correspond with a plate of hardened steel or other metal placed within the recess of each axle box, takes its bearing thereagainst; behind this metal plate a pad, slab, plate, or packing piece of vulcanized india-rubber or other permanently elastic material is placed for the purpose of giving end or horizontal play in the direction of the length of the engine or carriage. The thickness of elastic material on each side of each axle box may be varied in proportion to the amount of play or end motion required for passing curves, and the form of the metal plate or strip inserted between the elastic material, and the horn plate or guide may be varied, as also the dimensions and natures of the metal employed."

The third part of the invention relates to locomotive and other furnaces, but this part of the invention contains nothing which relates to the subject of the present series of Abridgments.

[Printed, 10d. Drawing.]

A.D. 1859, September 3.—N° 2011.

FRIOU, JOSEPH.—(*Provisional protection only.*)—"Detaching instantly the locomotives from railway carriages, and also for detaching instantly the harness from horses that run away when attached to any carriage."

This invention consists "of two iron arms, attached by pivots or hinges to the sides of the carriage, the extremities of which are pierced to receive a pin, which revolves upon a pivot fixed to the sides of the carriage; the ends of the traces are pierced in a similar manner to the arms. The attachment is made by bringing the pierced end of the trace upon the revolving pin, and then also bringing down upon the pin the pierced end of the arm, the latter being kept in this position by a spring. The detachment is effected by raising the arms by cords or other desirable means; a spring then attached to the pin throws off the trace, and the pin falls by the action of such spring; then, by means of a second set of traces passing under the carriage

" and attached thereto, so as to create a leverage," the motive power " is brought to bear upon one or more breaks attached to " the carriage."

[Printed, 4d. No Drawings.]

A.D. 1859, September 10.—N° 2069.

**MALLETT, EDWARD JONES.**—" Improvements in axles."

This invention relates to axles so formed as to allow wheels placed thereon to rotate independently of each other, such axles being composed of two or more parts, capable of rotating one within another. The invention is described in minute detail, the process of forming an axle being somewhat complex, and such as will not be clearly understood without the aid of the Drawings annexed to the Specification ; various modifications of the invention being, moreover, set forth. A main feature of the invention consists in causing two short solid axles to be inserted into the ends of an outer tubular axle, the short axles projecting therefrom sufficiently to receive the wheels of the carriage, and being supported in position by rings or collars at their inner ends, and short tubes, the short axles themselves being of smaller diameter than the bore of the outer tubular axle, screw bolts passing through the outer tube, and into such rings or collars, and preventing longitudinal motion of the short axles within such tube. In place of screw bolts, other mechanical appliances may be used, and axles constructed according to this invention may be applied not only to railway but to other carriages.

[Printed, 1s. Drawings.]

A.D. 1859, September 13.—N° 2083.

**SEITHEN, ANTON BRUNO.**—" Improvements in apparatus for " shaping cork stoppers, and in the manufacture of life buoys " and buffers of cork."

This invention consists in the first place in the employment of a grindstone for the purpose of shaping articles formed of cork, such grindstone having grooves in its periphery corresponding to the size of the articles to be operated upon, and the stone being, by preference, placed horizontally, such arrangement of the stone admitting of a number of operatives being employed at one time at such stone. The stone may be solid, in which case the opera-

tives would stand outside it, or it may be composed of segments so put together as to constitute a ring connected at one side to a revolving frame or table, and admitting of the operatives applying the articles to its interior circumference, which is in this case suitably grooved. Straight slabs of stone, suitably grooved, and having a reciprocating motion, may be used instead of a revolving stone.

Buffers of cork are constructed by the employment of "discs" composed of segments," each pair of discs having a plate of tinned iron or other metal placed between them, and the segments being united to each other as well as to the plate of metal by a powerful cement.

Another part of the invention consists in the use of two mandrils for shaping hungs and other articles of cork, one mandril being convex, and the other concave, the piece of cork to be shaped being placed between the two, and shaped by pressing one mandril towards the other; any superfluous material being removed by means of a suitable knife or cutter.

The improved life buoy consists of a core, disc, or ring of metal, which is covered with segments of cork, united thereto and to each other by cement, and the whole brought into shape by paring or cutting. Or instead of a metallic core, a hoop of gutta percha or a ring of rope may be used.

[Printed, *ad.* No Drawings.]

A.D. 1859, September 15.—N° 2101.

BRIÈRE, JULIEN.—"Improvements in railway breaks."

The object of this invention "is to cause the power of the axles of the running wheels to be exerted in operating the breaks."

"For this purpose, upon one of the carriage axles is formed or affixed a screw thread, which is capable of taking into the teeth of a corresponding wheel on a shifting axle, upon which is formed or affixed another screw thread taking into the teeth of a segment, giving motion by connection and leverage to the breaks. The shifting axle is moveable, so as to bring its toothed wheel into action with the screw thread on the carriage axle by an eccentric or tappet or other suitable agent, acted upon by a handle, placed conveniently for the guard or other person in charge of the train; and, if desired, any number of carriages of a train may be similarly provided, and the parts

" connected, so as to be simultaneously operated by the action  
" upon one of them."

Different modifications of the invention are described, the apparatus of one carriage being connected with that of another by hooks and chains, when it is desired that the breaks of a number of carriages shall be operated upon simultaneously.

[Printed, 8d. Drawing.]

A.D. 1859, September 17.—N° 2115.

LUIS, JOZÉ.—(*A communication from Laurent Rigolier.*)—

" Further improvements in brakes for railway carriages."

This invention relates to improvements upon the brake for which Letters Patent were granted to the present inventor on the 1st of February, 1859, No. 281, these improvements relating " especially to the particular form of the pieces," and not preventing the free adaptation of the brake to " every kind of railway carriage."

The principal difference between this and the former invention appears to be, that in this invention a somewhat different arrangement is made of the small levers and screw, by which, through the medium of a hand wheel, the guard withdraws the brakes from the wheels, and allows them again gradually to pass into contact therewith, when a gradual contact is desired, a sudden contact being caused, as in the first invention, by raising a retaining catch, which allows the brake springs at once to operate; an additional lever being, however, here applied to raise such catch. The variations between this and the former invention appear, however, to be very unimportant.

[Printed, 10d. Drawing.]

A.D. 1859, September 21.—N° 2148. (\* \*)

JOWETT, HENRY ALFRED.—" Improvements in breaks for  
" railway and other carriages, with means of communication  
" between guard or conductor and driver."

An eccentric keyed on the axle of one of the carriages by the running of the carriage works an air pump, and so compresses air into a receiver, where it is available either alone or in combination with water, for pressing on the breaks to the wheels, or for sounding a whistle or other signal.

[Printed, 8d. Drawings.]

A. D. 1859, September 30.—N° 2217.

ATKINSON, BENJAMIN.—“Improvements in railway brakes.”

According to this invention there is mounted upon a suitable frame on the under side of the carriage or van, “or whatever article is to be braked, and preferably placed near to or symetrically over the axle,” a saddle plate, “which, when a force is applied may, by means of guides, rods, or grooves be forced or carried easily from the centre to the right or left of the axis of the carriage.” From this saddle plate proceed slot link levers, which are in connexion with and actuate a system of brake levers and brakes, “throwing them in and out of action according as the saddle plate is urged from the centre to either the right or left of the central axis of the carriage.”

Another part of the invention relates to a mode of carrying this saddle plate so as to put the system of brakes into and out of action. Upon the axle of the carriage, over or underneath which the saddle is placed, the patentee cuts a thread, extending over about one-third of its length in the central part, placing around the axle a nut formed in two parts, so that when these parts are brought close together the thread upon the axle will work in the corresponding thread on the nut, and the latter will be carried to the one end or the other of the axle according to the direction of rotation. The nut is placed immediately under or in contact with the aforesaid saddle plate, so that when in action it carries the latter with it to the right or left, and thus actuates the brakes. “It will be seen that instead of cutting a thread on the axle of the carriage the saddle and nut may be mounted upon a subsidiary axle, which may be driven from the main axle by means of suitable gear.”

Another part of the invention relates to “throwing the said nut and the saddle plate into and out of action as required.” In order to effect this the patentee mounts over the saddle piece, and so as to be carried by it, a scroll plate, having slots in its under side within which studs from each portion of the nut work, so that if the plate be urged round in one direction the portions forming the nut will be brought close together so as to clasp the axle, and thus be thrown into action, actuating at the same time the breaks through the saddle plate. “When the action of the breaks is complete, and the carriage is brought to a stand-still, the nut is thrown out of action by means of a clutch lever,

" which detaches it from the axle, when by means of springs in connexion with the saddle plate this latter and the nut are urged back to the centre of the axle again."

Another part of the invention relates to means of actuating the scroll plate, which in its turn throws into action the nut and saddle plate, and through these latter the brakes. The first of these means consists in "a simple combination of levers communicating with the person in charge of the carriage," a small actuating lever attached to the scroll plate being connected with another system of levers which proceed to a place most convenient for the operator to act upon them. Another mode of effecting this is "much more comprehensive, and consists in introducing the force generated by electro-magnetism as a moving power." In order to effect this the patentee proposes to mount upon the saddle plate, mentioned above, and so as to be carried with it, an electro-magnet of suitable power, a small lever being hinged to the scroll plate and attached to the keeper of the magnet, the arrangement being such that whenever the current is completed the keeper will be drawn to the magnet, and will draw round the scroll plate, the nut being thus thrown into action. The circuit is formed of insulated copper wire passing from carriage to carriage, each being connected with the other "by means of a coiled spring at the junction of two carriages, which by their elasticity will compensate for the difference in length of the train at different moments of its motion."

[Printed, &c. Drawing.]

A.D. 1859, October 5.—N° 2266.

WEBSTER, JAMES. — "An improved construction of spring for carriages and other purposes."

This invention relates to the construction of a spring which may supersede the "laminated" spring, the spring formed according to this invention being "comparatively stronger, and requiring less space when in use" than the laminated spring.

According to one mode of carrying out the invention, a number of steel rods, which are tapered from near the middle to the ends, are bound together in the form of a bundle, and the ends all welded together and shaped into any desired form, the whole being then heated, twisted spirally, and bent over a convex block of the desired sweep, being then tempered and hardened.



According to another mode, a number of steel rods of any shape or form are twisted in the manner of the strands of a rope, the twisted coil being then cut into lengths, the ends of each length welded and dressed, the whole bent as desired, and then tempered and hardened.

One of the lengths thus formed may be swaged or rolled (before being bent and tempered and hardened) "from near the centre to the ends, leaving them of an uniform shape," the ends being then formed as requisite, and the whole bent, tempered, and hardened as before.

[Printed, &c. Drawing.]

A.D. 1859, October 7.—N<sup>o</sup> 2286.

BROOKES, WILLIAM.—(*A communication from Robert Stothert Kirkpatrick.*)—"Improvements in securing the tyres of railway carriage and engine wheels."

These improvements relate "to the form of the connecting part of the tyre of a railway wheel, with and of the corresponding part of the spoke, rim, or other rim of the wheel to which such tyre is affixed, and consist, first, in forming the spoke ring" of "wedge-like section;" and, secondly, in forming the tyre with an internal groove, suitable for the reception of such spoke rim, this groove being produced by, in the first place, constructing the tyre with an angular projection on one side, the other side projecting horizontally outwards, and the latter being bent over and pressed against one side of the spoke ring, after the latter has been placed with the angular projection within the angular projection of the tyre, the "and press" being used "and other respects the invention."

[Printed, &c. Drawing.]

## TENTING

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## VEHICLES FOR RAILWAYS.

" elastic material, such bag being surrounded by a movable  
" metallic cylinder " placed within a second cylinder, and acted  
upon by a piston or plunger attached either to the head of a  
buffer or to other apparatus adapted to the purpose for which the  
spring is required.

An arrangement is described as being applied to a buffer, in  
which the plunger is slotted, a stopping piece projecting into this  
slot preventing the plunger from being forced too far onwards.  
The object of the movable cylinder which surrounds the bag is to  
prevent friction of the latter against the interior of the outer  
cylinder in which the apparatus works.

[Printed, 6d. Drawing.]

A.D. 1859, October 11.—N° 2394.

TENTING, JOSEPH LOUIS, aîné.—" Improvements in the con-  
" struction of the axles of railway and other carriages "

This invention consists in " the employment, in addition to the  
" ordinary axle of railway and other carriages, of a hollow axle,  
" serving as an envelope or casing thereto, and has for object the  
" rendering of the two wheels of an axle independent of each  
" other, that is to say, each wheel able to turn according to re-  
" quirement and with facility in curves, whatever their nature,  
" and without friction on the rails, thereby effecting, first, a  
" great decrease in the tractive force required, secondly, a  
" diminution of the wear and consumption of the rails and of  
" the axle, and thirdly, an arrangement by which the wheels may  
" be turned inwards or outwards, according to the nature of the  
" carriage, and the position of the rails, and of the axle, and  
" as at present."

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" other elastic substances to give elasticity between the tires or  
" outer rims and the hubs or naves of railway or other wheels,  
" and between other metallic bodies."

This invention relates to the application of a band or ring of india-rubber or gutta percha between the tire or outer rim and the hub or nave of a wheel made otherwise wholly or partly of iron, for the purpose of giving it elasticity. It also relates to the employment of india-rubber or gutta percha between other metallic bodies in order to obtain elasticity or resist the effects of compression, and it consists " in taking india-rubber or gutta percha  
" which has been prepared for vulcanization by mixing with it  
" the metallic substances commonly employed for the purpose,  
" and while it is in the plastic state, and so introducing it into  
" the space prepared or provided for it between the parts of the  
" wheel or between the other bodies where it is to be used, and  
" subjecting it to the heat necessary to complete the vulcanization while in its place, by which means it may be made to  
" secure the parts of the wheel or the metallic bodies between  
" which it is applied in the proper relation to each other."

Before placing a tire or outside rim upon the inner rim of a wheel (for example) the outer portion of the latter and the inner part of the former are grooved, indented, or roughened, the inner rim being so much smaller than the tyre as to allow of a sufficient quantity of the india-rubber or gutta percha to be introduced between them. The tire being then placed around the inner rim, and the space between them being filled with the elastic material, plates are temporarily arranged on each side of the wheel to confine such material, the whole being then placed in an oven or heater to complete the vulcanization of such material, the side plates being afterwards removed, and the elastic material then locking the tire upon the inner rim " as securely as if it had been  
" shrunk on by heating and cooling."

[Printed, 4d. No Drawings.]

A.D. 1859, October 15.—N° 2350.

CHAPMAN, HENRY.—(*Provisional protection only.*)—" An improved self-acting safety railway break."

According to this invention a solid piston is fixed to the centre of the front cross beam of a railway engine, tender, or carriage, and from a tube fixed on the back cross beam of such engine,

tender, or carriage spring two circular arms, "and in the said tube works a piston with two circular arms, so that when the first named piston is forced against the head of the piston with the two circular arms their heads come against the heads of break shafts which act upon springs; such springs gradually extending until a break cross beam comes in steady contact with and locks or partially locks the wheels. When the carriage is relieved from pressure the springs bring the break beam back to its proper position, and force out the buffer shafts. Chains prevent the break from being placed too low, and others retain it in position when at rest. The break cross beam fixed to act on the front wheels of the carriage may be fitted to act on all the wheels simultaneously by placing it between the front and back wheels of each carriage. From the bottom of the tube fixe on the back cross beam and centre of the solid piston (first mentioned) is a straight piston communicating with a break cross beam, which in violent concussion acts on the hind wheels of the carriage before it. But when the arrangement, placing break cross beam between the front and back wheels of each carriage, is carried out, the last-mentioned cross beam and appurtenances are not necessary. The springs acting on the buffer shafts serve by their action on the heads of break shafts the keep the carriage steady."

[Printed, 4d. No Drawings.]

A.D. 1859, October 17.—N° 2371.

JONES, DAVID.—"Improvements in self-acting breaks to be used on railways."

The object of this invention is to cause the breaks of a railway train to be "put down" spontaneously on any tendency arising in the carriages of the train to overrun each other from the slackening of the speed of the engine or in descending an incline, and the invention "consists principally in connecting the break lever of one truck or carriage with the after part of the preceding truck or carriage in such a manner that as soon as the relative speed of the trucks or carriages is varied, and they consequently approach each other, each truck or carriage acts upon the lever of the following one, and so applies the break."

The mechanical arrangements adopting in carrying out of the invention may be greatly varied, but an arrangement is described

in which the break block of each carriage is connected to the shorter arm of a bell-crank lever, there being connected to the end of the longer arm a chain which is passed over a pulley and then connected to the carriage behind, the result being that while the carriages remain at a proper distance asunder during their traction the chains hold up the longer arms of the levers and keep the break blocks out of contact with the wheels, while on the carriages approaching each other, as mentioned above, the chains are so slackened as to let down the long arms of the levers and allow the shorter arms to press the break blocks into action. Weights may be connected to the levers if necessary, and other modifications of the arrangement made.

[Printed, &c. Drawing.]

A.D. 1859, October 24.—N° 2429.

FITZPATRICK, MATHEW. — (*Provisional protection only.*)—

“Apparatus to be applied to the prevention of accidents on railways, called parachoc.”

According to one part of this invention a railway carriage is provided at each end with a “collision pad,” forming a kind of buffer, and occupying the whole width of the carriage. The outer portion of each pad consists of a cushion suitably mounted, and having behind it spiral springs, there being behind these again, a second cushion, and next to that a plate furnished with holes, behind which plate is an air chamber. The whole of this apparatus is so mounted as to be capable of moving inwards in case of collision, and in that case it not only by its own elasticity breaks the shock of such collision, but on being forced inwards causes certain inclined planes to act upon upright bars having at their lower ends skids, the latter being forced down upon the rails and by their pressure thereon tending not only to stop the motion of the carriage but also to lift it from the rails. The effect of the “collision pad” is further increased by the air in the air chamber having to be driven out through a valve provided for the purpose, a second valve serving for the readmission of air upon the return of the pad to its first position, the skids being then raised from the rails by a spring. From the description given it appears that the pad at either end of a carriage is meant to bring skids into action at both ends of such carriage in case of collision, screws forming a means of communication between the

skids at one end of the carriage and those at the other, arrangements being also made by which the carriage may be backed without bringing the skids into action.

In another arrangement the pad is connected with an arrangement of levers and springs, the result produced being, however, the same as in the first arrangement. The apparatus may be applied to engines as well as carriages.

[Printed, *ed.* Drawing.]

A.D. 1859, November 4.—N° 2507.

JUZET, ETIENNE.—“Improvements in lubricating apparatus.”

This invention “relates to an oil box or lubricator for lubricating the axles of railway and other carriages. In this axle box “ the journal or bearing of the axle is completely enclosed, so “ that no dust or foreign matters can enter; one half of the surface is continually in the oil.” At the inner end of the journal of the axle is a groove, in which is placed a ring of india-rubber or gutta percha, or of leather surrounded by india-rubber, or of wood, or metal, combined with elastic packing; or the groove may be dispensed with and the ring placed upon the circumference of the axle itself, a suitable channel being arranged for the introduction of oil, and there being between the channel and the reservoir of oil a space enclosing air, which, by its pressure, “forces “ the oil to remain at the same elevation, that is to say, half “ covering the journal.” The channel is provided with a cover which is faced with leather, and is kept closed by a spring. The axle box is, as whole, so arranged that “the suspension springs of “ the vehicle are fitted into instead of being held by a strap to “ the upper part of the box.”

[Printed, *8d.* Drawings.]

A.D. 1859, November 10.—N° 2553.

HUGHES, EDWARD THOMAS.—(*A communication from Jules Clément.*)—“Improvements in railway breaks, also applicable for “ arresting the rotary motion of wheels and cylindrical bodies in “ general.”

According to this invention a “spirale hélicoïde” is fixed upon the axle of a railway carriage, and “combined with an intermediate organ or working bar, one extremity of which is acted “ on by the said ‘spirale hélicoïde’ whilst the other imparts



"motion to the break shaft lever." This "spirale hélicoïde" is double, and consists in fact of two cones united at their apices, and each having a screw thread passing along its surface. When one of the extremities of the working bar is placed in contact with the smaller diameter of this instrument and the latter is then made to rotate, the end of the bar is carried up the thread on one cone or the other, according to the direction in which the axle is turning, and the other end of the bar is thereby made to act on the break shaft lever and so press the breaks against the wheels. In order to cause this apparatus to act at the proper time the working bar is provided with a screw, by means of which it may be either advanced towards and placed in contact with the cones or withdrawn therefrom at pleasure, thus causing the breaks to operate or otherwise as may be necessary, the bar being also suitably stayed and supported in its movements. Or instead of the screw last mentioned the bar may have connected to it a series of levers, combined with certain catches, springs, and other mechanism, this arrangement for placing the bar in and out of contact with the cones being styled the "compound lever motion," and the other the "screw motion."

The details of the invention are described at some length, and include a mode of connecting the break apparatus of one carriage with that of another by means of square rods which pass between one carriage and another, each square rod passing near one end through a square hole in a collar connected to the break shaft of one carriage, and being provided at the other end with a tappet which is acted upon by another tappet on the break shaft of the next carriage, this arrangement admitting of either "successive or "simultaneous effects," in the working of the breaks, as may be desired, "enabling one break to be raised after the other, the "resistance offered at any time not exceeding that of a single "break."

[Printed, 1s. Drawings.]

A.D. 1859, November 15.—N° 2584.

WARD, WILLIAM HENRY.—"Improvements in wheels for rail-  
"way engines and carriages."

This invention consists in giving to the tread of the wheel, or that part of the wheel which comes into contact with the rail on which it runs, the peculiar shape known as the "ogee" form, the patentee stating that a wheel having a tread thus constructed, or

its equivalent, becomes "self-adapting to any line of railway in common use, without the flange (from necessity) coming in contact with the rail for guidance or direction," and that such a wheel will pass around curves in the rails with the same ease and freedom as along a direct line.

[Printed, *ed.* Drawing.]

A.D. 1859, November 19.—N° 2618. (\* \*)

KNIGHT, JOHN.—"Certain improvements in or applicable to looms for weaving, part of which is applicable to lubricating axles and bearings for other purposes." The patentee says,—  
 "The first part of my invention consists in japanning the boxes and covers of roller temples to prevent them from rusting when the fabric is woven in a wet damp state, and to economise the labour of polishing. In performing this part of my invention, the boxes and covers of the temples are japanned in the same manner as is now customary in japanned letter-copying presses or any other articles of cast iron; the journals for the rollers are then bored or cleaned out, and the temples are otherwise completed in the usual manner."

"The second part of my invention consists in turning or forming a spiral groove or spiral grooves in contrary directions on the crank axle or other axles of looms; the grooves extend the length of the bearings to retain and distribute the oil or other lubricating material. The bearings are or may be made with shoulders to prevent the escape of the lubricating material laterally, or the spiral grooves may be made in the bearings, and the axles can remain plain. This second part of my invention is applicable to axles and bearings for other purposes."

[Printed, *ed.* Drawing.]

A.D. 1859, November 21.—N° 2630.

JOCHEM, PIERRE.—(*Provisional protection only.*)—"Improvements in brakes for railway and other carriages."

For vehicles intended to run on railways "an apparatus is made use of by means of which one or more blocks may be pressed against the periphery of one or more of the wheels of the carriage, which apparatus consists of proper lever arms by which the said blocks are kept at a distance, or may be pressed

“ against the wheel or wheels, the said lever arms being connected to a chain, in one of the links of which a tooth or projection fitted on the axle of the wheels may be caused to enter and thereby press the blocks against the wheels, in such manner that by the rotating power of the axle the wheel will be prevented from turning, whereby the motion of the carriage will be retarded or altogether stopped. The brake apparatuses of the carriages of a train may be connected in such manner that the end being under the command of the guard or engine driver, these latter may cause the apparatus to act when required.”

For carriages intended to run on ordinary roads the brakes are constructed in such manner “ that either by means of a spring or springs, by pulling on strings, by a winch handle and gearing, or other similar means under control of the driver, a bolt may be pushed into a kind of hook fixed against the inner surface of the nave of one or more of the carriage wheels, thereby preventing them from turning, and thus retarding or stopping altogether the motion of the carriage.”

[Printed, 4d. No Drawings.]

A.D. 1859, November 24.—N<sup>o</sup> 2660.

PRINCE, FREDERIC.—(*Provisional protection only.*)—“ Improved apparatus for reducing the resistance of the atmosphere to the progress of railway trains.”

“ The apparatus to be employed for effecting this object consists principally of screws or blinds attached to the end of each carriage, and so constructed and arranged as to be readily caused to overlap the succeeding carriage both at the top and sides, for the purpose of enclosing the space between the ends of the carriages, and thus preventing the rush of air caused by the high velocity at which the carriages are travelling from acting against the front of the next carriage and impeding its progress. The said screens or blinds may be made of any suitable material, and may be attached to the carriages in any convenient manner; and in order further to reduce the resistance of the atmosphere, the engine and the carriage or break next to the engine may be fitted with a moveable front in the form of the bow of the vessel, or the fore part of a conical bullet.”

[Printed, 4d. No Drawings.]

A.D. 1859, November 26.—N° 2676.

**VANDECASTEELE, LOUIS JEAN.**—"An improved method of  
" coupling the locomotive with the tender, for the purpose of  
" giving greater adhesion between the wheels of the former and  
" the rails."

According to this invention, instead of connecting the engine to the tender by a horizontal coupling, or a coupling whose points of attachment in each are at the same height, the patentee makes the points of attachment on the engine to be in the side frames a little above the axle of the driving wheels, and that of the tender below the axle of its wheels, which latter, being lower than that of the driving wheels of the engine, gives an inclination to the coupling, and therefore to the line of traction, which effects the object in view. "The coupling is composed of several rods, properly articulated and combined with chains, in order to allow sufficient freedom of movement between the engine and tender."

The patentee states that by the use of this invention he considerably reduces the strain on the engine in passing round the curves of a line of railway, besides effecting a reduction of friction and increasing the security of the train, "by lessening its tendency to get off the rails, as compared with the system hitherto adopted for coupling or connecting the locomotive with the tender."

[Printed, 10d. Drawing.]

A.D. 1859, December 14.—N° 2844.

**IBBOTSON, ALFRED BUCKINGHAM.**—(*A communication from John Parker.*)—"An improved draw and buffer spring apparatus  
" for railway carriages."

This apparatus consists of rings of vulcanized india-rubber, separated from each other by plates or washers of metal, the ring at each end of the series fitting into a flanged collar, and the whole being pressed together and enclosed in a box or case; a central shaft passing through the case, the collars, the washers, and the rings. In this shaft are two slots, so formed "that a key driven through each of the flanged collars passes through the farthest end (from the centre of the shaft) of each of these slots, so that when the buffer heads or draw bar hooks are united to both

" ends of this shaft, this spring apparatus answers equally for  
 " both ends of the carriage to which it may be attached, both for  
 " buffers and draw springs, besides giving the draw springs the  
 " advantage of working through the whole train at the same  
 " instant."

[Printed, 6d. Drawing.]

A.D. 1859, December 17.—N<sup>o</sup> 2874.

PLUM, THOMAS WILLIAM.—"Improvements in the manufacture of tyres for railway and other carriage wheels, and of hoops and rings, and in machinery employed therein."

This invention consists in "scarfing" the ends of bars of metal, which bars are afterwards bent and the ends brought together and welded, in order to form tyres for railway and other carriage wheels, hoops, and rings. A tyre bar is first forged or rolled in the ordinary manner, and "while hot, at any point of the manufacture before the bar is brought to its finished section," the ends are prepared for welding by "scarfing or cutting them into correspondingly zig-zag or irregular forms to make a scarf joint." The machinery employed consists of a circular saw, or a rotatory or other suitable cutting apparatus, and the ends having been duly prepared, the bar is bent into the proper form, and the scarfed ends brought together. The latter are then raised to a welding heat, and welded together "by hammering and rolling, or either," but when this operation is effected by rolling, the patentee makes use of a machine similar to that used for bending and blocking tyres, the rollers being made sufficiently strong, and being driven at a speed suitable for completing the weld and bringing the tyre to its finished section.

Although it is mentioned above that the scarfing may be performed while the bar is in a hot state, it may, if more convenient, be performed while the bar is cold.

[Printed, 6d. Drawings.]

A.D. 1859, December 19.—N<sup>o</sup> 2882.

WILSON, EDWARD BROWN, and NORTH, ROBERT SAM.—"Improvements in the manufacture of cranked axles, and also of tyres for railway and other wheels, and in the machinery or apparatus employed therein."

As regards cranked axles, this invention consists in forging for each "a straight bar, round in certain parts, and flattened or "squared at others," and afterwards pressing such flattened or squared parts "into the form of a crank by a machine composed "of three hydraulic cylinders and rams, one ram forcing the flat part of the bar between two moveable cheeks, which are "acted upon or resisted against by two other rams, thereby forming the crank with the fibres of the iron running one way "throughout."

As regards tyres, the patentee proposes to make each tyre out of a bloom which is formed into a hoop, and then to roll it to the proper size and thickness "by a machine having three shafts, "with thimbles or ferrules to suit the tyre." Of these, "one "shaft is fixed, and the other two are moveable, two shafts being "used when rolling, and the third when it is required to form "the tyre to a true circle." Tyres thus formed may be composed of wrought iron, or of steel, or of both combined, by composing them of "a series of rings or pieces," and the complete rings thus formed being then subjected to the rolling process mentioned above.

[Printed, 10d. Drawing.]

A.D. 1859, December 19.—N° 2886. (\* \*)

PELLISSIER, LOUIS, JANNESSE, JULES, and CASTILLON, EDOUARD.—(*Provisional protection only.*)—"An improved brake "for railway carriages, and mode of transmitting signals for "making the same."

"This improved brake consists in applying to the ordinary "skid brake apparatus of railway carriages, a spiral or other "proper spring of sufficient strength, and acting in such manner "that by the unbending of the spring the brake may be caused "to act with great rapidity and force." In ordinary circumstances, when the common brake apparatus is sufficient, a clutch prevents the above mentioned spring from acting. The contrary action to that which causes the skids to act, obliges the spring again to be bent. "Each carriage of a train must have its own "brakesman."

The principal feature of this brake "consists in having two "skids applied to each wheel, and causing the skids of all the "wheels of a railway carriage to apply itself simultaneously "against the periphery of their respective wheels."



" For allowing the engine driver instantly to communicate  
 " with the brakesman, the engine or tender is provided with a  
 " galvanic battery, connected by isolated wires or other proper  
 " means, with alarms situated on the carriages; by which  
 " means the driver may consequently transmit the required  
 " signals to the brakesmen."

[Printed, 4d. No Drawings.]

A.D. 1859, December 20.—N° 2907.

GARDINER, PERRY G. — " Springs for carriages or railroad  
 " cars."

According to this invention " it is proposed to combine two  
 " elliptic spring blades with an elastic or extensible tension bar,  
 " the ends of the elliptic springs being confined in the heads or  
 " caps at the extremities of the intermediate tension bar. The  
 " heads or caps may either be formed in one piece with the  
 " tension bar or fitted thereto by screws and nuts, and are  
 " grooved or slotted to receive the ends of the elliptic springs, or  
 " the caps may be fitted by means of screws and nuts to the ends  
 " of the tension bar; or the ends of the tension bar may be turned  
 " over so as to form eyes into which the correspondingly turned  
 " ends of the elliptic springs are fitted, a ball or rivet being passed  
 " through for the purpose of keeping them in their place. The  
 " tension bars may be of an undulating form in the middle part,  
 " or they may consist of a pair of elongated curved steel blades,  
 " placed together, with their curves outwards, but joining or  
 " meeting at the ends where screw threads are cut, fitted with  
 " nuts for holding the caps."

Different modifications of the invention are described.

[Printed, 6d. Drawing.]

A.D. 1859, December 21.—N° 2909.

PLIMSOLL, SAMUEL. — " Facilitating the unloading and trans-  
 " ferring from railway wagons into carts and barges, &c. the coals  
 " and other matters with which they may be loaded, and for  
 " storing the same."

One part of this invention relates to discharging coals from  
 railway wagons in such manner as to prevent them from so  
 falling as to be broken and reduced in value. One arrangement

for this purpose consists in the use of an inclined shoot, which is brought close up to the bottom of the wagon, and by this means, when the trap in the bottom of the wagon is opened, "the coals" simply slide down the inclined shoot so disposed, which subjects "them to no violent concussion, and consequently to no breakage." Another arrangement consists in so disposing the rails upon which the wagon is brought to be discharged that the floor of the latter is inclined "from side to side," so that on a door which is formed in the side of the wagon being opened the coals pass therefrom and down a shoot into suitable receptacles. This door "may or may not form a part of the delivery shoot; if to form part thereof it should fall down on its hinges and be furnished with quadrant cheek plates," which may draw out of the wagon and from the sides of such shoot, "the door forming the bottom."

Another part of the invention relates to the construction of a "step piece, to be hung on to the side" of coal wagons, and on which the workmen can mount and stand in order to work the coals out at the opening in the wagon, "instead of standing on the buffer rods or other inconvenient footing, as now practised." Each step piece is provided with a single prong or hook piece, to grip the edge of the wagon, with a T or cross piece to rest on such edge and ensure steadiness. A permanent platform may also be erected, "on which the workmen can stand and walk for a similar purpose."

[Printed, 10d. Drawing.]

A.D. 1859, December 22.—N<sup>o</sup> 2921.

FLEET, BENJAMIN, RAWLINGS, JOSEPH, and CLOAKE, THOMAS. — "Improvements in the machinery for stopping the bodies and wheels of railway and other carriages, and which machinery is an improvement on the machinery already patented by Letters Patent granted to Thomas Cloake, dated the 1st March, 1859."

According to this invention each carriage of a railway train is furnished with a longitudinal shaft, the shaft of one carriage being coupled to that of another "in such manner that a partial revolution imparted to one shaft is transmitted to the next, and so on throughout the train. The partial revolution given to the moving shaft actuates an arm fixed thereon, such arm

“ being connected with an arm on a transverse shaft mounted  
 “ midway between the wheels on which, at each side of the car-  
 “ riage, is a fixed double-armed lever or beam, the one arm of  
 “ which is connected with the break surface of the wheel in  
 “ advance, and the other with the break surface of the wheel  
 “ behind. The connection of the one arm is at the upper part,  
 “ and of the other at the lower, the fulcrum being intermediate  
 “ of those positions.” The break surfaces are mounted on pivots,  
 “ the one at the upper part and the other at the lower, while the  
 “ lever connections are at the opposite and free ends of the break  
 “ surfaces.” The longitudinal shafts of the different carriages  
 are connected by means of “ triple-jointed pieces,” which act as  
 universal joints, and the shafts are furnished with parts which  
 permit of their elongation or contraction, as may be required,  
 such parts consisting either of a socket at the end of one shaft,  
 into which the end of the next shaft passes, or of discs fixed on  
 the ends of the shafts with rods passing through holes therein,  
 the rods having nuts thereon outside the discs, and spiral springs  
 being placed on the rods between the discs. “ The first motion  
 “ is given to the shaft fitted to the brake van by the guard or  
 “ other attendant of the train by means of a screw acting on a  
 “ nut carried by a lever fixed on the brake van shaft, which shaft  
 “ acts on the breaks of its own carriage, and, being also connected  
 “ with the shafts of the other carriages, as described, actuates the  
 “ whole breaks of the train. The carriages are to be further  
 “ coupled by ordinary couplings.”

[Printed, 10d. Drawing.]

A.D. 1859, December 31.—N° 2995.

GREGORY, THOMAS CURRIE.—(*Provisional protection only.*)—

“ Improvements in railway carriages.”

This invention relates essentially “ to the adaptation to railway  
 “ carriages, as at present in use on British railways, that is, with-  
 “ out any alteration of the existing rolling stock in itself, of the  
 “ comforts and conveniences of a steam vessel, so that long  
 “ journeys may be accomplished with comfort to passengers,  
 “ and without the necessity of the long stoppages now  
 “ made.”

Railway carriages are thus to be provided with sleeping berths,  
 couches, or sofas, washing conveniences, and waterclosets. The

arrangements of the carriages may be varied, but one plan is described in which the carriage forms a single open saloon, with opposite doors in the sides, near each end, these opening into a transverse passage, on one side of which, forming the end portion of the carriage, are placed washing conveniences and closets, whilst on the other side is a door leading into the sleeping saloon, the latter containing two tiers of berths and a warming stove. By lengthening the carriage it may be formed into two saloons, and by using very long carriages, having a swivelling truck at each end to enable them to pass round curves, a large number of sleeping berths may be arranged in one carriage. Such carriages may be ventilated by means of ventilators in the roof with curved hoods, placed in the roof, and side ventilators for the admission of fresh air, and may be provided with adjustable folding seats which will be more convenient than moveable stools.

[Printed, 4d. No Drawings.]

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## 1860.

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A.D. 1860, January 13.—N° 95. (\* \*)

HAYES, JOSEPH.—“An improved break for common road  
“and railway carriage wheels, applicable also to the wheels of  
“machinery for raising and lowering weights.”

“This improved break consists of two levers, on which are fixed  
“the break blocks, which are pressed against the wheels by the  
“levers acting in a loose box formed in a traversing nut, pressure  
“being applied by a screw or lever. The break may be worked  
“from the front, back, or side of the vehicle or machine, and  
“may be made to act upon the boss or rim of the wheels. The  
“screw works perpendicularly or horizontally, as the case may  
“require.”

Different modifications of the invention are described.

[Printed, 10d. Drawing.]

A.D. 1860, January 25.—N° 186.

DIXON, JOHN, and CLAYTON, ROBERT. — (*Provisional protection only.*) — “Improvements in rolling and shaping iron and  
“steel for manufacturing railway wheels.”

The inventors state that in manufacturing railway wheels "it is desirable to make that portion of the bar which forms the felloe wider than the portions forming the spokes," and that in order to accomplish this they "make circular grooves in the rolls of the shape of the bar to be rolled," by which means a bar, when rolled, "is left the full width at the part required for the felloe, and reduced at the parts forming the spokes." The ends of the latter may be "bevelled at the sides, when the nave is cast on, or they may be made taper, and wider at the ends, when they are to be welded together to form a solid nave."

In reducing the width of the bar for the spokes the metal may be entirely or only partly removed, in the latter cases punching, or shearing, or other suitable means being employed to complete the operation. The bars thus rolled may be flat or of other form, and a rib or ribs may be formed thereon if desirable.

[Printed, 4*l*. No Drawings.]

A.D. 1860, January 28.—N<sup>o</sup> 221.

DUNN, THOMAS.—"Improvements in machinery and apparatus for altering the position of locomotive engines and carriages, and for preventing injury and accidents on railways."

That part of this invention which relates to preventing accidents on railways consists "of certain additions to the usual railway carriages and to the permanent way," "the object being to prevent the carriages, when an accident occurs, from leaving the line of rails, and from dropping down or jumping up more than a few inches." The main feature of this part of the invention consists in the use of T-headed or flanged rails, over and partly around which work slides or clips which are connected to the carriages of a train, the arrangement being such that "in case an axle breaks or any other accident occurs the carriage can neither rise up, drop, or move laterally, more than the play allowed in the slide."

Different modifications of the invention are described, in some cases the rails being flanged on both the upper sides, while in other cases they are flanged on one side only. And these arrangements may be applied either to the rails of the permanent way or to special rails laid down between them. The slides, moreover, may be of different forms, and may in some cases be so contrived as to act as horns for the purpose of removing obstacles which may

chance to be upon the rails. Screws and gearing may be so arranged as to place these slides at different distances apart. Rollers may be placed above the slides so as to sustain the carriage in case of the breakage of an axle, and other modifications of the details of the arrangements made according to circumstances. The other parts of the invention do not require notice here.

[Printed, 1l. 1s. 10d. Drawing.]

A.D. 1860, January 28.—N° 222. (\* \*)

JOHNSON, JOHN HENRY.—(*A communication from François Auguste Dufey.*)—"Improvements in the steeling and cementation of metals."

This invention relates to "a simple and economic mode of steeling or cementing metals, and of improving the quality of inferior steel, and consists in effecting such processes by the vaporization resulting from the boiling of a combination of animal, vegetable, and mineral substances, into which vapour the metal to be treated is to be immersed." The vaporization may be prepared by combining the following ingredients in the following proportions:—

Grease	-	-	-	500 parts by weight.
Oil	-	-	-	500 "
Charcoal	-	-	-	350 "
Prussiate	-	-	-	250 "
Horn	-	-	-	330 "
Saltpetre	-	-	-	300 "

"By the above mixture the cementation of cast iron of all kinds may be obtained in a few minutes." The same system is equally applicable to the hardening of various parts of machinery or tools, whether of wrought or cast iron, and to the hardening of the rails of "railways," and the wheels, springs, and other portions of the rolling stock."

[Printed, 4d. No Drawings.]

A.D. 1860, February 1.—N° 265.

NEWTON, WILLIAM EDWARD.—(*A communication from Augustin Castellvi.*)—"Improved apparatus for retarding railway carriages."

According to this invention the breaks of all the carriages of a train "are connected together by rods, so that the guard may by



" means of the gearing in the break van be enabled to act on all  
 " the breaks simultaneously, or nearly so, and thereby bring the  
 " train to a standstill in much less time than usual."

" The efficacy of the action of the improved system and arrange-  
 " ment of retarding apparatus is rendered more certain and com-  
 " plete by the application of a mechanical contrivance for regu-  
 " lating and determining the distance between the breaks, so  
 " that the action of one break may not interfere with the action  
 " of another one. The gearing for bringing the breaks into  
 " action is actuated by means of a hand wheel through the inter-  
 " vention of a pair of cones, one of which is on the axle of the  
 " running wheels, and the other on the lower end of a vertical  
 " shaft. By bringing these two cones into contact, the gearing  
 " of the retarding apparatus is brought into action, and the  
 " breaks are forced against the running wheels throughout the  
 " train."

The details of the invention are very fully set forth.

[Printed, 10d. Drawing.]

A.D. 1860, February 4.—N<sup>o</sup> 294. (\* )

TAYLOR, JAMES. — (*Provisional Protection only.*) — Improve-  
 ments in "traction engines" for use on rails, tramways, roads,  
 or unprepared ground.

1. Suspending from a hinge by the side of each ordinary broad  
 tyred wheel so as to reach below their peripheries, a broad bar  
 curved downwards at the lower end for the purpose of forming a  
 movable flange or guide to each wheel, when in use on trams or  
 rails, and supporting it in its place by a block and bracket fixed  
 to the frame of the engine. Also the use of circular flanges  
 against the sides of plain broad tyred wheels; these revolving  
 on excentrics formed on adjustable bushes or collars and fitted on  
 the axletree. According to one position of the bush the flanges  
 and wheels can be made to work together as flanged wheels on  
 trams or rails, or by another position of the bush the circular  
 flange can be raised so that its periphery is above the plane on  
 which the broad wheel is alone required to run, as on common  
 roads.

2. Regulating the speed and power of locomotive or "traction  
 " engines" driven either by toothed gearing or with chains, by  
 the use of male and female cones, instead of as heretofore, by the

use of clutches; or "when motion is communicated from the engine to the driving wheels, through overhanging half cranks or stud discs and connecting rods, I fit upon the end of each driving and each driven shaft a disc having a slot therein across its diameter, and each projecting stud or pin is caused to travel along the slot by means of a screw, which is acted upon or caused to rotate whilst the engine is in motion by a tripping piece or a curved rack being projected forward, so that the pinion or star wheel upon the screw end is acted upon thereby, and the projecting stud pins are caused to move along the face of the disc."

3. Applying struts or legs working upon studs fixed to the driving wheels near the axles, or on excentrics thereon, to be used in times of need, for pushing a traction engine out of hollows, or up steep gradients, with arrangements for putting them out of action when not required.

4. Relates to completely encasing the gearing and parts of a locomotive boiler and engine, and providing openings and doors for gaining access to the working and other parts described in the Specification of the "patent granted to me the 13th day of November, 1858, No. 2548."

5. Forcing the feed water through a group of pipes placed longitudinally in a chamber, through which the exhaust steam passes in a lateral direction on its passage from the cylinder to the atmosphere.

[Printed, 4d. No Drawings.]

A.D. 1860, February 11.—N<sup>o</sup> 368.

DIETZ, DAVID.—"An improved oil box for lubricating the axletrees of railway carriages or waggons, applicable also to the shafts of all kinds of machines."

This invention consists in causing a portion of the axletree (or shaft) to revolve in oil. In order to do this the "oil hole" of the bearing "is situated at a certain height, so as to allow for the wear of the brass bearing while the journal keeps running in oil. A half collar or metallic stopper, which may be provided in its middle with a band of leather or any other suitable compressible material, is laterally carefully adjusted within a chamber of the oil box; this collar or stopper prevents the oil from flowing out, but as, on account of the rotation, a small quantity

" of oil is forcibly carried behind the stopper, a thin metallic washer or disc fixed securely on the axle prevents the leakage of the oil, and collects the small quantity which has been carried into the break chamber of the box; the oil thus gathered by the disc is flung up by centrifugal force against the upper part of the box, and at a tangent to the circumference of the disc it falls into the various channels cut into the upper part of the box, whence it runs back into the first reservoir through apertures made for that purpose."

The details of the invention are very fully set forth.

[Printed, 8d. Drawing.]

A.D. 1860, February 20.—N<sup>o</sup> 454.

OSBORNE, THOMAS.—"Improvements in coupling and uncoupling railway and other vehicles."

According to this invention " it is proposed to substitute a mechanical lifting arm or lever for the hands of the attendant in coupling and uncoupling a vehicle, the attendant being required merely to work a hand lever or levers placed at one or both sides of the vehicle, in place of having to enter between the two vehicles to adjust the coupling link on the draw hook. The side lever or levers above referred to is or are connected to a cross shaft carrying the lifting arm or lever above referred to, which acts either directly upon the links or indirectly thereon through the intervention of a radius rod or rods, and has the effect, when actuated, of elevating the coupling link and dropping it into the draw hook, or of raising it from the draw hook and then releasing it, when it will drop down into the ordinary suspended position. Suitable balance weights and tightening screws may be applied, if found requisite, and the improvements may be combined with the ordinary couplings at present in use."

The patentee states that various modifications of the invention may obviously be constructed for accomplishing the object in view without deviating from the principal or main feature of the invention."

[Printed, 10d. Drawing.]

A.D. 1860, February 24.—N<sup>o</sup> 507.

JOHNSON, JOHN HENRY.—(A communication from *Ferdinand Schwenk*.)—"Improvements in the reduction of friction in the

“ working parts of machinery, applicable also to the transmission of motive power.”

This invention relates to “ a peculiar system or mode of converting the sliding friction of machinery into a rolling friction by the aid of certain peculiar constructions and arrangements of antifriction rollers, and the surfaces upon which they rotate; and also to a peculiar system or mode of constructing the teeth of gearing, for the obtainment of a steadier and smoother motion.”

In carrying out the first part of the invention “ it is proposed to employ a suitable number of antifriction rollers, which are to be inserted between the two friction surfaces. These antifriction rollers may have either a cylindrical or a conical form, and they are provided with raised helical or conical threads, whilst the two surfaces between which these rollers are to run are provided with corresponding helical or spiral grooves, into which the threads on the rollers gear. This engagement of the threads with the grooves prevents the rollers from moving otherwise than in the desired direction, whilst all sliding motion therein is obviated.” This part of the invention is described under various modifications, and as applied both to the axles of railway and common road carriages.

The remainder of the invention is not set forth as being applicable to either railway or other carriages.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, March 6.—N<sup>o</sup> 607.

FIELD, EDWARD.—(*Provisional protection only.*)—“ Improvements in the manufacture of railway tyres.”

The inventor mentions in the first place that ordinary tyres “ have a transverse weld to form the ring,” and that the object of this invention “ is to dispense with the said weld, and to form the tyre so that the fibre of the iron or steel employed is arranged to run helically or spirally round the circumference.” He then states that this is effected in the following manner:—“ A bar of wrought iron or steel, of a variable thickness accordingly as may be required, is wound helically or spirally round a mandril, guage, or other suitable apparatus, as may be found most convenient. The rings of iron or steel thus formed are then welded together either at one operation, or a

" portion of it at a time, as may be found desirable, and the tyre  
" is finished, ready for the subsequent processes necessary, before  
" fixing it upon the wheel."

[Printed, 4d. No Drawings.]

A.D. 1860, March 13.—N<sup>o</sup> 671.

NEWTON, WILLIAM EDWARD.—(*A communication from William Wharton, junior.*)—"Improvements in railway tracks and carriage  
" wheels."

One object of this invention "is to allow one or more of a  
" series of trains that run over a common railway to pass the  
" switches or other appliances that may be used at the intersec-  
" tions of branch ways with the common or main railway without  
" being interfered with or turned out of their proper way by  
" such switches."

Another object of the invention is "to arrange at the crossings or  
" intersections on railways a turnout or other analogous appliance  
" in such a manner that such train, although allowed without inter-  
" ference to pass the switches, turnouts, or other appliances at  
" the intersections of the branch ways used by other trains, will  
" be allowed to pass on its own track or way without the aid of  
" switches, or any appliance requiring manual adjustment."

The patentee states that in carrying out the invention "two  
" peculiarities or characteristic features are necessarily employed,  
" namely, car wheels provided with two or more treads in connec-  
" tion with auxiliary raised wheels, stationary or moveable, and  
" with these the ordinary flanged car wheels may be employed."  
This condition of the parts may, however, be reversed, and the  
same effect obtained. For instance, a train of cars may be provided  
with ordinary flanged single-tread wheels, and an elevated bridge  
rail.

The patentee also states that there is one other feature con-  
nected with this invention which renders it valuable, this being  
the employment of elevated rails of different heights, with wheels  
having inner treads of varying diameters, "so that each car or  
" train of cars will be able to pass the intersections of all branch  
" roads other than its own." It is immaterial on which side of  
the main rails the elevated rails are placed, provided the treads of  
the wheels are correspondingly arranged to be acted upon by the  
elevated rails.

[Printed, 10d. Drawing.]

A.D. 1860, April 3.—N° 849.

SIMPKIN, EDMUND. — (*Provisional protection only.*)—"Improvements in couplings for carriages, wagons, and other vehicles on railways."

The object of this invention is to afford means of coupling and uncoupling railway vehicles without an attendant having to go between them, and the invention consists in fixing "to each end of the carriage, wagon, &c., an arm having a serrated or toothed surface, the tooth being of that form commonly called 'ratchet.'" This serrated arm is "fixed in such a position as will allow it to move horizontally," so that when the vehicles are brought together they couple with facility. One end of each of the serrated arms works on a hinge joint, fastened either to the draw rod or body of the carriage, and is kept in position by springs which press the serrated faces together. These springs may be fixed either to the hinge joint, the body of the carriage, the serrated arm, or to any other suitable part of such carriage, and a lever is used for uncoupling, to which may be fixed the springs for pressing the serrated arms together. Instead of this uncoupling lever, however, a rod or shaft may be placed across each end of the carriage, there being on this rod or shaft a collar, and the end of the rod or shaft being provided with a screw thread working through a wheel or handle, by turning which the rod or shaft is made to traverse and press the collar against a projecting piece or pin, thereby causing the coupling to disconnect. The invention may also be so arranged as to be used in connection with the ordinary coupling, and instead of the rod or shaft mentioned above having upon it a screw thread working through a screw or handle, the latter may be fastened to the rod or shaft, and work through a female screw.

[Printed, 4d. No Drawings.]

A.D. 1860, April 7.—N° 881.

CLARK, WILLIAM. — (*A communication from James Hervey Deming.*)—"Improvements in axles or journals in combination with lubricating axle boxes for railway and other carriages."

The object of this invention "is to prevent the escape of oil from railway axle and other like journal boxes in general." And the invention consists "in combining with the journal box and journal a cone upon the axle, interposed between the



“ journal and the face of the box through which the axle passes, the base or larger end of the said cone being towards the journal. By means of this combination all the oil which gets on the axle, and which otherwise would travel along the surface of the axle and finally escape from the box, is caused by centrifugal action to travel up towards the base of the cone, and is thereby retained in the box; and when applied to journals and boxes such as above mentioned, the same action carries the oil where it is required to supply the journal of the friction rollers.”

[Printed, 8d. Drawing.]

A.D. 1860, April 17.--N° 965.

CARMONT, WILLIAM, and CORBETT, WILLIAM. — (*Provisional protection only.*)—"An improvement in casting steel tyres for wheels, which is also applicable to casting other articles of steel."

This invention "is designed for the purpose of preventing the defects or 'seams' caused by the imperfect union of molten steel when introduced or poured into the mould as it flows around the 'core,' and arising from the very rapid chilling peculiar to steel."

The improvement consists "in running the molten steel in one mass into the mould employed, and from one large opening, and afterwards rapidly forcing the 'core' downwards, or into the molten mass, by means of screw or other mechanical or steam power, thereby displacing the central portion of the fluid metal, and forcing it into the further extremities or limit of the mould, by which means the casting is formed or cast in one entire piece, and is consequently free from such imperfections as are usually caused in casting at the junction or meeting of the streams of molten metal."

[Printed, 4d. No Drawings.]

A.D. 1860, April 26.—N° 1051.

TRAIN, GEORGE FRANCIS.—"Improved system of railway or tramway to be used with horses or other power, and passenger carriages for the same."

This invention consists, in the first place, "of a system of tramway and railway combined," the rails being so formed as to be adapted for the reception of either the ordinary wheels of common vehicles or the flanged wheels of railway carriages; this part of the invention belonging more especially to the series of Abridgments relating to railways. It may be mentioned here, however, that one feature of this part of the invention consists in forming the rails with a flat surface for the reception of the wheels of ordinary vehicles, and a raised surface on which the flat parts of the tires of railway wheels may work.

The carriages, the construction of which forms the second part of the invention, are each formed with an oblong body, furnished with glazed sashes or windows at the upper parts of the sides, such sashes being capable of sliding upwards, and being furnished with Venetian blinds, which may be depressed, when not in use, into recesses below the window frames. Each end of the vehicle is provided with a sliding door, and a platform, from either side of which access may be obtained to the door. The roof extends over the platforms at each end, and is furnished with seats, to which access is obtained by a small staircase or staircases arranged for the purpose. The roof is, moreover, provided with an awning, which, by means of a roller, may be adjusted as may seem convenient, and at each end of the roof is a bell, with which arrangements are connected by which the bells may be rung from any part of the vehicle. The body of the car is mounted upon two pairs of flanged wheels, these being fixed upon their axles, and the latter revolving in suitable box bearings, and being provided with springs which are formed by preference of india-rubber balls, hollow, but filled with air, and placed within cylinders in which they are surrounded with molasses, the body of the carriage being supported by pistons which rest upon the balls. In cases in which the vehicle is intended to travel upon a road having sharp curves the wheels may be loose upon the axles, instead of being fixed thereon, and the vehicle is provided with brake blocks which are connected to rods and levers, and brought into action simultaneously by means of vertical spindles, which may be turned by handles, and caused thereby to coil upon them chains which are connected to the system of rods and levers already mentioned. The vehicle is capable of travelling with either end first, and the "poll" and other parts to which the horses are harnessed are capable of being detached from the vehicle by the pole being

connected thereto by a moveable bolt or pin, which may be readily withdrawn.

[Printed, *sd.* Drawings.]

A.D. 1860, April 27.—N° 1069. (\* \*)

FLOIRE, LOUIS ALEXANDRE.—(*Provisional protection only.*)—  
“An improved electric break.”

In one arrangement, the attraction of an armature by an electro-magnet sets free a system of levers, and allows a heavy sliding piece to descend into gear with a conical screw keyed on to the boss of one of the wheels; the skid levers are thus brought into action so as to force the skids against the wheels. To withdraw the brakes the movement of the carriage is reversed; a cam on the conical screw raises the sliding piece, and thus places both sets of levers in their original positions. Two electric circuits are used to excite the electro-magnets; in one the electro-magnets are placed one after the other in the same circuit, and the sending of the current causes “a simultaneous locking action;” the other circuit is, in the first instance, limited to the first carriage, but the movement of the first keeper or armature puts the second electro-magnet into circuit, and so on until all the electro-magnets in the train have been excited *seriatim*.

In another arrangement the attraction of an armature by an electro-magnet causes a “tongue piece” to engage itself in a screw on the axle of one of the wheels of the carriage; this action disengages a bar which allows the resistance of the train to act on the skid levers by means of the buffer rods. As soon as the train moves ahead the buffer rods replace the bar, and the “tongue piece” is raised out of the threads of the screw. The electric circuit is made through the traction bar; if the traction bar becomes broken, the drag chain displaces a hook, and allows an “elastic metallic plate” “to bear on the other buffer rod, and  
“so to make the circuit.”

[Printed, *sd.* Drawing.]

A.D. 1860, May 10.—N° 1157.

WILSON, ALEXANDER.—“Improvements in the construction  
“of railway carriages, waggons, and trucks, which improvements  
“are also applicable to vehicles for common roads.”

This invention consists in constructing vehicles for railways, as well as for common roads, by the use of "lattice built iron or steel frames, bodies, and under frames, either in combination or otherwise. Flat, channel, angle, or T iron or steel are the most suitable sections for the purpose, and are arranged diagonally to the side and end sole bars of the carriage, and riveted together where the diagonal bars intersect or cross each other;" the patentee stating that carriages and frames thus constructed "will possess great stiffness, strength, and durability, and be of less weight than those constructed in the ordinary manner."

Different modifications of the invention are described, suitable for different classes of vehicles.

[Printed, 10d. Drawing.]

A.D. 1860, May 17.—N° 1215.

MENNONS, MARC ANTOINE FRANÇOIS.—(*A communication from Oscar Prevosté.*)—"An improved railway brake."

According to this invention there is applied near each wheel of a railway vehicle, and capable of being placed in contact therewith, a "semicircular iron bandage," this having connected thereto a nave or boss, in which one of the axles of the vehicle moves freely, but which admits of the nave or boss of the bandage being so moved as either to place the "bandage" in contact with the wheel or remove it therefrom at pleasure, such bandage, when applied to the wheel, acting as a brake. In order to apply these bandages to the wheels, and release them therefrom at pleasure, a screwed shaft and certain nuts and connecting rods are employed, the brake apparatus of one carriage of a train being connected with that of the carriage before and behind it by the shaft of each carriage being made square at the ends, and a long socket, having a correspondingly shaped passage through it, being placed between one carriage and the next to it, the shafts sliding in the sockets, and so compensating for any variation which may occur in the distance between one carriage and another; "articulations," however, being provided for the purpose of adapting the apparatus to the passage of curves in the line of rails upon which the carriages may be travelling. The patentee mentions, as a main feature of the invention, the placing of the suspension point of the bandage or brake "at a certain distance behind the perpendicular of the axle of the vehicle."

[Printed, 8d. Drawing.]

A.D. 1860, May 22.—N° 1258.

**BLACKBURN, BEWICKE, and CARR, HENRY.**—(*Provisional protection only.*)—"Improvements in railway axle-boxes and "axles."

According to this invention a railway axle box is provided with an oil chamber below the axle, from which the oil is raised to a pad or brush in contact with the journal of the axle by the capillary attraction of cotton wick or similar material, dipping into the oil. In order to prevent waste of the oil, a ring or flange of metal, or leather, or other suitable material, is placed on that part of the axle which adjoins the shoulder of the journal; or a groove may be formed behind the shoulder, and the latter thus be made to constitute a ring or flange. The same effect may be produced by so constructing the pad or pads employed for lubricating the axle, that such pad or pads may come in contact with the ring or flange mentioned above, and "wipe off the oil from "it." The pad or pads may be sustained by weights or springs, and a collar of leather or other suitable material "may be placed "at one or both ends of the axle-box to prevent the entrance of "dust and dirt."

[Printed, 4d. No Drawings.]

A.D. 1860, May 23.—N° 1282. (\* \*)

**DUCLOS DE BOUSSOIS, FRANÇOIS JOSEPH EDOUARD.**—(*Provisional protection only.*)—"This invention relates to an improved system or mode of manufacturing tubular metal articles, "such, for example, as hollow axles, shafts, gun barrels, and "masts, and consists essentially in the substitution of cast steel "for wrought iron in such manufacture. In making a hollow "axle or tube according to this invention, it is proposed to prepare a block of cast steel of an annular form, the weight and "dimensions of which are proportioned to the weight and dimensions of the hollow cast-steel axle or other article to be "produced. This cast-steel ring having been heated to a welding heat, is placed on a mandril, and rolled thereon between a "pair of rolls according to the manner described in the Specifications of Mr. James Edward McConuell's Letter's Patent, "of the 28th August, 1851, No. 13,729, and the 24th June, 1852, "No. 14,182,"

[Printed, 4d. No Drawings.]



A.D. 1860, June 1.—N° 1352.

**GREENWOOD, THOMAS, and BATLEY, JOHN.**—"Improved machinery for cutting and shaping wood."

The first part of this invention relates to cutting, boring, and morticing the "sills" or long timbers used in forming the frames of railway carriages, and for other purposes. These operations are all performed in one machine, which consists of an "elongated bed," provided with clamps for holding the timber, "nipping rolls," by which it is moved, and standards supporting suitable cutting tools and drills, which are actuated through the medium of wheels, levers, and other mechanism.

Another part of the invention relates "to the shaping up of wood, chiefly to irregular forms." To this end the patentees propose "to combine in one machine a travelling bed, like that of a planing machine, with a compound fixed head for carrying a vertical cutter spindle, and a dumb tool which may be termed a profile cutting machine. By means of a hand lever these tools are kept in contact, the one with the pattern and the other with the work."

The details of the invention are minutely set forth.

[Printed, 1s. 10d. Drawings.]

A.D. 1860, June 4.—N° 1370.

**REID, THOMAS.**—(*Provisional protection only.*)—"Improvements in machinery, apparatus, or means for actuating or working railway brakes."

This invention relates to a system of actuating railway brakes "by means of the weight of the carriage bodies," and their appurtenances and loads, "the parts being so arranged that the body can be easily and quickly raised and lowered, either by a movement worked by hand or by purely mechanical means."

Different modes of carrying out the invention are mentioned, wedges, elbow joints, moveable links, or other connections being applied between the carriage springs and the wheels or axles, and connected with gearing which may be actuated by the guard of the train; or apparatus being so arranged in connection with the buffers and draw bars of the train that the carriage bodies are lowered on the engine ceasing to exercise its tractile force, and raised when such force is again put into action.



" In fitting common road vehicles in this way, the same general system is carried out, but with the agency of simpler actuating mechanism."

[Printed, 4d. No Drawings.]

A.D. 1860, June 7.—N° 1398.

BATH, JAMES PARKER.—(*Provisional protection only.*)—" Improvements applicable to carriage wheels for use on common highways, railroads, or tramways."

This invention consists " of a simple appliance whereby common carriage wheels can be used on railways or tramways as well as upon ordinary highways," such appliance being composed of " segmental guide plates, flaps, or bars, suspended to the axle of the carriage, and extending down the inner side of the wheels," and a little beyond the periphery thereof, thus serving as flanges when the wheels are travelling upon rails, but being so arranged as to be capable of being raised, when the wheels are running upon a common road, so as not to interfere with the working of the wheels thereon; suitable rods, levers, and other mechanical appliances being employed to effect such raising.

[Printed, 4d. No Drawings.]

A.D. 1860, June 12.—N° 1442.

NEWTON, ALFRED VINCENT.—(*A communication from Asa Hopgood.*)—" An improved carriage ventilator."

The object of this invention is to secure a mode of introducing fresh air into railway cars, and of separating the dust from the air before it is introduced into such cars. The patentee mentions that various devices have been contrived for this purpose, and that in some cases a current of air has been driven by a fan (operated by the running gear of the car) through or over a wheel revolving in water contained in a suitable box, the dust being deposited upon the wheel as the air passed through or over it; while in other cases the air was driven through a wet screen. He states, however, that these devices have been found objectionable from their complication, and from their having been arranged at the bottom of the car, this part of the arrangement causing them to receive a greater quantity of dust than would be otherwise the case.

In the present invention a light wheel is used, which is composed of a shaft in which is inserted a large number of rods or spokes placed close together, the wheel being "so arranged in a suitable casing or box that it will be revolved by the current of air passing through the box, and impinging on the spokes of the wheel which are exposed to the current, whilst the spokes, as the wheel revolves, are kept wet by being dipped into water to purify the air."

The details of the invention are minutely set forth, the apparatus being mounted on the top of the carriage, and the box being provided with a suitable hood through which the air is directed to the wheel, and such hood being reversible so as to act when the carriage is moved in either direction. The air passes down into the carriage through a suitable opening, and in order to render the action of the ventilator more certain in case of the position of the carriage causing the wind to strike it obliquely, the axis of the wheel is provided at each end with a fan, these fans working outside the box. A modification of the invention is described, in which the hood is open at each end, certain shutters or valves serving to direct the air to the wheel according to the direction in which the carriage is travelling. The box in which the wheel works is in all cases partially filled with water.

[Printed, 8d. Drawing.]

A.D. 1860, June 16.—N° 1465.

COATES, CHARLES.—(*Provisional protection only.*)—"Improvements in the construction of breaks for carriages."

As regards carriages for common roads, this invention "consists in applying an internal break to the nave or naves of the wheels," such break being composed of "an eccentric fixed to the axle," in combination with which is "a moveable cam furnished with leather or other suitable material, acting on an internal flange fixed to the nave of the wheel; a pin or stud from the cam takes in a radial slot in a plate which is loose on the axle, and to which a lever is attached, to which the power for applying the break is connected. When the break is applied to two or more of the wheels on the same carriage, the cords or straps connected to the levers are taken through the eyes of levers fixed to a shaft, to which the handle for working the breaks is applied."

The inventor states that the "mechanical arrangement for connecting the power to the breaks may be considerably varied," and that the arrangement of parts forming the internal break may also be modified.

When the invention is applied to locomotive engines and carriages, "the excentric is attached to the axle bearing, and the other parts of the break are connected to the axle."

[Printed, 4d. No Drawings.]

A.D. 1860, June 16.—N° 1471.

HICKMAN, JOHN.—(*Provisional protection only.*)—"Improvements in draw-bars for railway carriages and trucks."

This invention "consists in giving elasticity to draw-bars for railway carriages and trucks in the direction of their length," this being effected by forming the draw-bar in two parts, and connecting such parts through the medium of bow springs, or springs and chains, or springs combined with jointed bars or plates, or a plate or plates of steel bent into a suitable form.

[Printed, 4d. No Drawings.]

A.D. 1860, June 23.—N° 1537.

GATWOOD, EDWARD.—(*Provisional protection only.*)—"Improvements in making wheels applicable to railway carriages and locomotive engines."

This invention consists, firstly, in "making the ring or inner tyre (to which the spokes are welded) bevelled on the outer periphery, and grooved near to one side to form a dovetail;" and, secondly, in furnishing the tyre or outer hoop with a dovetail groove in its internal periphery, "so that when the tyre or outer hoop is heated and put on to the skeleton, the contraction which takes place in cooling forces it down the incline made on the inner tyre, and thereby fastens it without the use of rivets or bolts." For "further security, in the event of the tyre or outer hoop breaking, small projections are rolled at intervals or continuously on the inner tyre, and are knocked down on the edge of the outer hoop when it has contracted properly."

The invention is stated to be applicable also "to wheels with cast centres and bent spokes, either welded at corners or not."

[Printed, 4d. No Drawings.]

A.D. 1860, June 29.—N<sup>o</sup> 1575.

TAYLOR, JAMES.—“Improvements in locomotive engines and “wheel carriages.”

The first part of this invention relates to “traction engines,” and does not belong to the subject of the present series of abridgments.

Another part of the invention relates to trucks or other carriages which are intended to be formed into trains and drawn by steam or other power, the patentee stating that whether such trucks or carriages be on three or on four wheels, he so constructs them and arranges the steering apparatus as to ensure their following in track. For this purpose he takes a tail lever or tiller bar from the front of the fore or leading wheel or wheels, and places it between two horns or studs projecting from the top or the bottom side of the hind axle of the preceding truck; “thus, on the first truck turning to the right or to the left the “studs or horns cause the tail lever or tiller to be correspondingly “acted on. The trucks are coupled together by means of links “or hooks.” When the trucks or carriages have three wheels only the single wheel is arranged in connection with a wheel plate and rings in a manner similar to that adopted in the construction of the traction engine, in which grooves are arranged for the lubrication of the parts, the axle of such wheel being mounted in a suitable frame, and the axle bearing being provided with india-rubber springs. “With this steering arrangement “and mode of connecting a perfect pivoting is ensured, and a “correct vermicular action can be obtained throughout a train “composed of any number of trucks or carriages.”

This invention consists in part of improvements on the invention for which a patent was granted to the present patentee November 13th, 1858, No. 2548, and he points out several differences between the two; and the invention includes a certain arrangement of portable locomotive engine which is more particularly intended as a self-moving hoist or travelling crane, but which may be likewise used for drawing or hauling, and as a traction engine, and which may be used either upon edge rails or upon a common road, or on a wharf wall, or in any situation in which it may be conveniently employed for loading ships, loading and unloading waggons, and other purposes. The wheels are in one arrangement *fixed upon the axles*, and motion is communicated to

them through the medium of gearing which may be arranged either as a differential motion or otherwise. "Or when such engines are employed upon railways having many curves the propelling power may be applied to the wheels on one side thereof, and the wheels on the opposite ends of the axles left free to revolve independently."

[Printed, 2s. 2d. Drawings.]

A.D. 1860, July 9.—N<sup>o</sup> 1651.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Jean Jan, called Paulet.*)—(*Provisional protection only.*)—"Improvements in railway breaks."

This invention consists "in the employment of levers, carrying at bottom shoes or skids, two of which are brought into action simultaneously on wheels opposite one another and on the same axle, and effectually shoe or skid the wheels."

The invention may be applied to as many carriages of a train as may be found necessary. "The play of the levers carrying the shoes is limited, and a spring or springs are connected to them to take off or prevent any shock. A break rod, which may be continued from one carriage or van through the whole train, brings the skids under the wheels, and draws them free from the wheels and the rails after the train has been moved backward to allow of the skids being released."

[Printed, 4d. No Drawings.]

A.D. 1860, July 12.—N<sup>o</sup> 1682.

SHAW, HENRY.—"Improvements in means or apparatus for stopping railway trains."

This invention relates "to the application to each of the wheels desired of a railway train of apparatus adapted to pass between the wheel and the rail." This apparatus, which the patentee denominates a "drag wedge," is "of the form of a half or part of a circle of corresponding section and diameter to and in front of the wheel proposed to be drag-wedged. It is connected with the buffing apparatus, supported on a moveable leg or fulcrum resting on the axletree of the carriage. The toe of the drag-wedge is bevelled to a thin edge, like a chisel, to facilitate its being drawn into action by passing between the wheel and the rail. A rod, chain, or other band, carried along

" the carriages, may bring the drag-wedges of the entire line  
" simultaneously into play. The wheels of the engine may also  
" be available for the drag-wedges applied by a crank movement.  
The chain or other band may be wound up round a drum; or  
rods drawn by a drum or otherwise may actuate such chain or  
band. " A guide bar connected with the lower parts of the drag-  
" wedges will lift them from off the wheels as they are elevated  
" and carried out of action."

[Printed, 8d. Drawing.]

A.D. 1860, July 14.—N° 1698.

BRAGGE, WILLIAM.—" Improvements in the manufacture of  
" tyres for railway wheels."

This invention consists " in the formation of a ring or hoop of  
" continuous wires, either of iron or steel, or both, or either, or  
" both, combined with plates or bars wound upon an expanding  
" block or frame, and afterwards welded into a solid ring or tyre,  
" either by the hammer, or by rolls, or by any of the methods  
" now in use for hammering, welding, or rolling tyres."

The wires used may be of any shape, but the patentee states  
that he prefers to employ wires of " the triangular or flat " form.

[Printed, 4d. No Drawings.]

A.D. 1860, July 16.—N° 1711.

HENSON, WILLIAM FREDERICK.—" Improvements in railway  
" carriage, buffer, and other springs."

This invention has relation to the employment of volute or  
spiral springs, and consists essentially in the application of " a  
" conical or conoidal plunger, or piece of metal or other suitable  
" material, with a spiral step or groove, somewhat similar to the  
" fusee of a watch, in such a manner that as the pressure on the  
" volute spring increases, this conical plunger comes in contact  
" with the convolutions of the spring one after another, com-  
" mencing with the central convolutions, and terminating with  
" the exterior ones, until all further motion of the spring is  
" arrested."

The particular form of the plunger may be varied, and when a  
spring " is to be exposed to tension or compression on two oppo-  
" site sides," a plunger may be applied on each side of such



spring. And the springs may be formed of steel, "of a trough  
" or grooved section," or of "a hollow tubular section at one  
" end, and gradually flattened towards the other end;" or of a  
trough or grooved section, "with the sides flattened towards the  
" one end, and opened out towards the other end."

Various modifications of the invention are described.

[Printed, 16d. Drawing.]

A.D. 1860, July 18.—N° 1737.

DU TREMBLEY, PROSPER VERDAT, and MARTIN, ANDRÉ  
DÉSIRÉ.—"Improvements in brake apparatus suited for railway  
" carriages and other purposes."

This invention relates to "the application of air pumped into or  
" exhausted from a vessel having a piston working therein, or a  
" diaphragm connected to the end or ends thereof, by which  
" motion may be given through a rod or rods, and by the in-  
" creased area of such piston or diaphragm in relation to the  
" diameter of the pumps sufficient power may be obtained for  
" enabling the rods and their connections to operate upon and  
" sufficiently govern, both as regards time and power, brakes,  
" friction straps, clips, or bands, friction clutches, and other means  
" of breaking, retarding, or regulating the speed of machinery in  
" motion."

The details of the invention may be varied, but the patentees  
state that the brake apparatus "is composed of two principal  
" parts, first, a common pneumatic pump, either suction or  
" forcing, as may be required, so as to act with the air expanded  
" and the simple pressure of the atmosphere, or with the air  
" compressed; second, a metallic vessel with piston and a flexible  
" membrane or covering of vulcanized caoutchouc or suitable  
" material; a cylinder with piston pressed with packed leather,  
" calculated in both cases according to the effect to be produced  
" to retard or stop the body in motion. Air-tight tubes in metal,  
" gutta percha, caoutchouc, or any other suitable substance, are  
" used to connect the pump with the vessel or cylinder, and  
" complete the apparatus."

The connection between the end of the air pipe of one carriage  
and that of another is effected by means of a novel arrange-  
ment of mouth piece or box, which is composed of two pieces,  
held together through the medium of certain horns and pro-

jections and certain slots, the effect of the arrangement being such that the ends of the two pipes are brought into close contact, and any escape of air from the joint prevented. The details of the invention are described at some length.

[Printed, 1s. Drawing.]

A.D. 1860, July 20.—N° 1758. (\* \*)

DICKINSON, JOSEPH.—“Improvements in machinery for  
“retarding or stopping railway or other carriages, and for other  
“purposes where breaks are applicable.”

The object of this invention “is to retard the motion of and to  
“stop railway trains and other carriages, and for other purposes  
“where breaks are applicable, more expeditiously than by the  
“machinery now generally known and in use.”

The patentee describes the application of the invention in the first place to a railway train, thus :—“I connect a fast and a loose  
“pulley or other suitable apparatus to the axle or other revolving  
“part of the locomotive engine or tender, or to any or all the  
“carriages, trucks, or vans of which the train is composed ; or  
“the fast and loose pulley or other apparatus may be applied to  
“an additional shaft connected by gearing or otherwise to the  
“axles. A strap or cord connected to the break passes around  
“the pulleys, and is traversed laterally from the fast to the loose  
“pulley, or vice versâ, by means of guides connected by chains,  
“cords, and levers, or other connection to the guard’s van, or to  
“the engine, or to any or each carriage of the train. When it is  
“requisite to retard or stop the train the straps or cords are  
“moved from the loose to the fast pulleys, thereby causing the  
“breaks to be drawn with great force against the wheels. The  
“breaks are suspended near the lower portion of the circumference of the wheels, so that when released they hang free from  
“the wheels by their own gravity, or each break may be furnished  
“with a counterpoise.”

[Printed, 4d. No Drawings.]

A.D. 1860, July 25.—N° 1797.

LEVERSON, MONTAGUE RICHARD.—(*A communication from William Hogg Brown.*)—“Improvements in applying springs to  
“locomotive engines, and to railway and other carriages.”

According to this invention the “horns” of a railway vehicle,

which support the axle boxes or bearings, are provided with leaves or plates "that constitute the springs," two of such leaves or plates being applied to each axle box or bearing. The details of the invention may be variously modified, the springs being in some cases entirely above the axle box, and in other cases partly above and partly below such box.

"Any number of these leaves or plates may be used in each case, according to the duties they have to perform," and the buffers "may be connected to the carriage frame by like springs; and other carriages may be hung on like arrangement of springs."

[Printed, 10d. Drawings.]

A.D. 1860, July 25.—N<sup>o</sup> 1798.

KINGSLEY, JEFFRIES.—(*Provisional protection only.*)—"Improvements in railways, and carriages to be used thereon."

This invention is described at great length, and more particularly with reference to the conveyance of mail bags. According to one arrangement four large light wheels have suspended from their axles a sort of carriage, which is meant for the reception of the mails and an attendant. This carriage may be propelled by the aid of a main spring contained within a box, and acting in a manner similar to that of a watch, "main springs being supplied to the carriage while proceeding onwards;" or it may be driven by a locomotive which may be impelled by steam, heated air, or gas. The wheels may be ten feet in diameter, and arranged obliquely, so as not to be damaged by the walls of tunnels, and their flanges, instead of being situate inside the circumference of the wheel, may be "consolidated with the outside thereof," thus contributing to prevent the carriage from jumping off the line. Such a carriage may, if desired, be placed either in front or in the rear of an ordinary mail train, and in case of accident to such train be despatched alone to the next station.

In order to keep the carriage still more securely upon the rails, strong iron wires may be arranged alongside of the latter, and in such manner as to act as guides to the rods by which the body of the carriage is suspended from the axles, the carriage being thus prevented from tilting, the inventor stating that "channels similar in purpose may be grooved in the irons of ordinary railways, the pendent rods being applied to the carriages."

Other modifications of which the invention is susceptible are set forth, the carriage being in some cases suspended from three and in other cases from only two wheels, in the former case a longitudinal bar being laid along the middle of the railway for the reception of the third wheel. And the invention likewise includes various matters connected with the construction and fixing of the rails of railways, but these matters do not belong to the present series of abridgments.

[Printed, 4d. No Drawings.]

A.D. 1860, July 31.—N° 1855.

FORD, HENRY WILLIAM. — (*Provisional protection only.*)—  
“Improvements in elastic buffing and drawing apparatus suitable  
“for railway vehicles.”

As regards buffers, this invention consists in the employment  
“of an interior block plunger in each buffer, over or upon which  
“the hollow plunger containing the spring slides during the  
“action of the buffing, the hollow plunger and its supporting  
“case being of the usual description.”

As regards drawing apparatus, the invention consists in the  
employment of “one or more cross heads, to which are attached  
“the draw bars and side or cheek draw bars, or chains, or any of  
“them, so that strains upon them, or upon any of them, will be  
“distributed by the said cross heads over the spring or springs  
“used and placed upon the headstocks or other framing of the  
“vehicles.”

[Printed, 4d. No Drawings.]

A.D. 1860, August 2.—N° 1867.

PARTRIDGE, EBENEZER. — “Improvements in axles and axle  
“boxes.”

This invention consists in the first place “in forming a screw  
“thread on the ends of axles, or in the outer ends of the journals  
“of axles, with one or more longitudinal slots cut in the thread,  
“but not extending through the thickness of the axle; in form-  
“ing a nut to screw over the thread, with holes round the cir-  
“cumference thereof; and in the employment of a screw or pin  
“for passing through one or other of the holes” round the nut,  
by removing which pin, the nut can be turned to tighten up the  
axle when required.

Another part of the invention consists in the employment of a cap, which may be screwed to the inner end of an axle box, and which will prevent the axle, "should it break at or about the inner end of the journal or elsewhere inside the box, from getting away from the box."

And the invention further consists "in forming the boxes in which the journals or ends of railway and common road carriages enter, of cast iron, with a cylindrical steel centre or tube to receive the journals or ends of the axles;" such centre or tube either extending the whole length of the box in a continuous line, or being divided in such manner as to form a bearing for holding lubricating matter.

[Printed, 6d. Drawing.]

A.D. 1860, August 3.—N<sup>o</sup> 1879.

HIGGIN, JAMES.—"Improvements in railways, in railway carriages, and in the mode of retarding and stopping railway carriages."

According to this invention the rails of railways are composed of strong angle iron, bolted or otherwise attached to longitudinal sleepers. The carriages are furnished with wheels which are without flanges, and of much greater diameter than usual, the bodies of the carriages being, however, so constructed and arranged as to be only about four inches, more or less, above the rails, that part of each carriage which is immediately over the rails being provided with plates of iron, having flanges which work within the rails, these flanges answering the purpose of the flanges ordinarily applied to the wheels.

When it is desired to stop or retard a train, the bodies of the carriages are lowered until the flanged plates, already mentioned, are in contact with the rails, such lowering being effected by means of screws, to which motion is given by means of gearing and certain longitudinal shafts passing below the carriages, and actuated by an auxiliary engine connected to the locomotive engine or the tender, or by other suitable means. Or in case of the breaking of a wheel or axle, or the occurrence of any other accident liable to bring one of the carriages down upon the rails, the apparatus for lowering the other carriages may be instantly brought into operation by means of a spring or friction apparatus, which is so arranged as to be acted upon by the increased resistance

produced; and the said spring or friction apparatus may also be in connection with the starting lever of the locomotive, so as to shut off the steam at the same time.

The steam for the auxiliary engine is shut off when the screws have been turned sufficiently to lower the carriages down upon the rails by means of a worm on the longitudinal shaft below the engine or tender, which turns a worm wheel carrying a stud which acts upon the lever by which the steam has been turned on, and on the auxiliary engine being reversed in order to raise the carriages from the rails, the same apparatus again controls the extent of the movement. Indexes are placed on the engine and on the carriages, which show the distance of the carriages from the rails. The longitudinal shafts of the engine and carriages are connected together by means of "conical blocks and internal cones," or other suitable couplings, and other suitable arrangements made for facilitating the action of the apparatus. Thus the connection between the tender and the first carriage of the train is formed by means of a draw hook, which is so connected to the valve gear of the auxiliary engine that in case an axle or wheel should break, or one of the carriages be brought suddenly down upon the rails, the steam will be admitted to the cylinders of the auxiliary engines; and such valve gear may moreover be connected by means of rods or chains or other suitable apparatus to the guard's van, so that the guard can also start the engine when required.

The invention may also be applied to carriages of the ordinary construction, or to carriages with flanged wheels, in which case the plates which are to press upon the wheels are without flanges, and are forced down upon the rails by means of eccentrics actuated by suitable gearing. Blocks of wood may in this case be substituted for the plates.

The details of the invention may in all cases be variously modified.

[Printed, 102. Drawings.]

A.D. 1860, August 7.—N<sup>o</sup> 1907.

NEWTON, WILLIAM EDWARD.—(*A communication from Jules Piant.*)—(*Provisional protection only.*)—"Improved apparatus for retarding carriages."

This invention relates to working the breaks of vehicles, intended to be propelled "on common roads or railways by



" horses, mules, or other animals of draught. The breaks are  
 " brought into action automatically, and are made to bear on the  
 " wheels of the carriage by simply arresting the progress of the  
 " horses, and generally without it being necessary for the coach-  
 " man to perform any operations beyond those which are usually  
 " adopted when pulling up the horses. In order, however, to prevent  
 " accidents in the event of the horses running away or refusing  
 " to obey the driver, it is proposed to adapt to the apparatus a  
 " winch handle or other suitable and convenient contrivance,  
 " whereby the coachman may be enabled to bring the breaks into  
 " action when required, by simply giving the handle a few turns.  
 " The splinter bar or whipple trees, to which the tracts are  
 " attached, are connected with levers, which are made to act by  
 " means of connecting rods or other analogous mechanical  
 " appliances on the break levers, so that by checking the progress  
 " of the horses, as when going down hill, the draught will be  
 " taken off the levers, and the breaks will, by means of strong  
 " springs, be forced against the wheels, and the progress of the  
 " carriage will be thereby retarded. Immediately, however, the  
 " animals begin to pull against the levers (as when going up hill  
 " or on level ground) the breaks will be drawn away from the  
 " wheels. By means of the winch handle, before mentioned,  
 " the driver will, however, have command over the breaks, so  
 " that he may be enabled, if required, to skid the wheels. Pro-  
 " vision may also be made for preventing the breaks from acting  
 " against the wheels when the carriage is being backed."

[Printed, 4d. No Drawings.]

A.D. 1860, August 10.—N<sup>o</sup> 1941.

PLUM, THOMAS WILLIAM.—(*Provisional protection only.*)—

" Improvements in fixing tyres upon wheels, and chairs upon  
 " sleepers, part of which is applicable to rivetting generally."

This invention consists in the first place in "making a groove  
 " or grooves in the tyres of railway wheels, of such dimensions  
 " as may be found most suitable according to the size and pur-  
 " pose of the tyre, one such groove being formed round the inside  
 " of the tyre (the side opposite the fillet), or on both sides if  
 " required." Such groove or grooves may be formed during the  
 making of the tyre, which the patentee states is preferred, or  
 after the tyre is otherwise completed, and ready for the wheel.

The invention consists, in the second place, in the employment of a circular fillet, or a tongue of wrought iron, or steel, or other suitable metal for securing the wheel within the tyre on one or both sides, such fillet or tongue being either flat or bevilled, or rebated and rounded or moulded, and driven into the groove in the tyre, after the latter has been shrunk upon the wheel, and is still warm. Such fillet or tongue may be further tightened by the application of force or pressure of any ordinary kind upon the edge of the tyre nearest to the groove. The ends of such fillet or tongue may then be further secured by rivetting or welding, or by a "key piece," so formed and fixed as to keep the said fillet or tongue extended in its diameter, and secured by what the inventor terms a "cup and cone rivet," the latter being also applicable for rivetting purposes generally; or a key piece may be so formed as effectually to secure the ends of the said tongue, and be held in position by a metal plug, run into the wheel or tyre, the latter being by any of these means securely connected together without bolts.

Another part of the invention consists in casting the chairs used for supporting the rails of railways "with the bolt holes at an angle instead of being perfectly vertical," the bolts or spikes for fixing the chairs being consequently "driven into the sleepers skewwise," by which arrangement they do not so easily draw "by the action of the wheels upon them."

[Printed, &c. Drawing.]

A.D. 1860, August 15.—N° 1982. (\* \*)

SAMUEL, JAMES, and TRAIN, GEORGE FRANCIS.—"Improvements in rails for streets and roads, and in wheels and axles to be used thereon."

The improvements in rails consist "in constructing them in such forms as will allow of their being reversed and used on the opposite side to that rendered unserviceable by wear." Six different modifications of this part of the invention are described, the rail in each case being furnished with "raised portions for flanged wheels to travel on," one of such portions projecting upwards and the other downwards when the rail is in position, and one or the other being brought into use by reversing the position of the rail.

The improvement in wheels consists in constructing them "with tyres about one-half of the breadth of which is of a different diameter to that of the remaining portion," these wheels being thus capable of running upon either raised rails or common roads.

The improvement in axles consists in the employment of "two separate axles superposed, or one behind the other, one end of each axle having a wheel on it, while the opposite end carries no wheel." The objects of this improvement "are to enable carriages to travel round sharp curves without straining the axles, and to reduce friction in rolling round curves."

[Printed, 1s. Drawings.]

A.D. 1860, August 23.—N<sup>o</sup> 2028.

PURCHAS, SAMUEL.—(*A communication from Albert Purchas.*)  
—"Certain improvements in the application of brakes to railway carriages."

This invention consists in a "peculiar way of arranging or applying brake friction to the periphery of the wheels of railway carriages while a train of such carriages is in motion." The object of the invention is effected by the compression of the buffers, which brings the brakes into action, "and which brakes are relieved when the progress of the train is sufficiently arrested by the expansive force of the buffer springs," thus, for instance, by stopping or reversing the tractile power of the engine the buffers will be immediately compressed by the momentum or impetus of the motion of the carriages forming the train.

The details of the invention are composed essentially of a strong band, made by preference of steel, within which a packing of vulcanized india-rubber or other suitable material is employed, there being within this segments of wood or other suitable material, a brake being thus formed suitable to the size of the wheel upon which it is to act, and extending around more than half of the circumference of such wheel. To the ends of the outer steel band or clip connecting rods are secured, which rods are connected to a lever or levers, placed on one or both sides of the wheel, such lever or levers being operated upon by the compression of the buffers on the carriages of a train approaching within a certain distance of each other. These details, with their adjuncts, are very fully described.

[Printed, 10d. Drawing.]

A.D. 1860, August 27.—N° 2057.

MENNONS, MARC ANTOINE FRANÇOIS.—(*A communication from Augustin Joseph Cambon.*)—"Improvements in the construction of axle boxes and axle bearings."

This invention consists "in the application of hard metal spheres of unequal diameters to the working surfaces of axle boxes and axle bearings of machinery," and "rolling stock of all kinds." In each of the axle boxes constructed on this system is placed "a metallic collar, round the outer circumference of which is formed a groove or canal. Around this groove is distributed any desired number of hard metal spheres in pairs of unequal dimensions, and over these spheres is fitted a second grooved collar, formed in the metal of the box or inserted therein," the arrangement being completed "by the insertion of the axle end in the inner collar, to which it is keyed or otherwise secured. The same system is carried out in the construction of axle bearings, the spheres being distributed around the axle, either with or without the interposition of the moveable collars, the latter being, if so desired, replaced by corresponding grooved bands cast on or fitted to the extremities of the axle itself. The ranges of spheres in each box or bearing may vary in number from one or two upwards, according to the nature of the machinery to which they are adapted, but for ordinary purposes, the double series as above is most advantageous."

The invention is described in detail as applied to "an independent wheel axle box," which is obviously meant for railway purposes in cases in which each wheel has its own separate short axle. And other applications of the invention are set forth as being suitable for waggons, and the axles and shafts of machinery in general, the patentee stating that the object and effect of the invention is "to increase the smoothness of the movement, while doing away with the destructive friction which has been found to result from the rotation in the same direction of spheres of equal diameter."

[Printed, 10d. Drawing.]

A.D. 1860, August 28.—N° 2071.

EFFERTZ, PETER.—"Improvements in machinery or apparatus for making bricks, tiles, and similar articles, and in apparatus

" for transporting the same, which improvements are also applicable for the utilizing of turf, peat, coal dust, or similar articles."

One part of this invention relates to the construction of a transport wagon, which consists in the first place of a metal wheel frame, which rests upon wheels having tyres provided with rims or flanges, and suitable for travelling upon rails, the frame being also provided with buffers. Upon this frame are fastened certain "conducting bearers," which are so connected by bars as to form two frames upon the already mentioned wheel frame. In these two frames slide in grooves cut in the bearers, two other frames which carry certain endless aprons, these last-mentioned frames being formed of wrought-iron toothed bars which are held together by means of certain roller bearers and stay rods. The frames carrying the endless aprons are raised and lowered by the movement of certain toothed wheels, fixed upon a shaft on which are also worm wheels in gear with screws or worms placed upon other shafts provided with crank handles. Between the roller bearers, and supported by them, are rollers, which are connected by linen covered with india-rubber, so as to form a series of endless aprons or moveable tables, upon which are pushed the bricks, tiles, or other articles from a main apron carried by the machine. To one of the shafts or wheels of the wagon there is connected a "stopping wheel," upon which a catch or curbing hook may at any time be brought to bear, the whole arrangement being such that when the endless aprons contained in one of the frames are filled with bricks or other articles, the required forward movement may be given to the other endless aprons.

A modification of this transport wagon is described in which the framework which carries the endless aprons is supported by rings, one of which is capable of revolving upon the other, and so bringing the endless aprons into different positions.

[Printed, &c. Drawings.]

A.D. 1860, September 5.—N<sup>o</sup> 2141.

COOPER, JOHN.—(*Provisional protection only.*)—"Improvements in railways, railway carriages, and apparatus connected therewith."

One part of this invention relates to means for indicating the speed of a railway train; another part to apparatus for displaying



to passengers on railways the name of the station they are approaching, and the number of minutes which should elapse on the journey between different stations; another part to improved railway switches; but these parts of the invention do not belong to the subject of the present series of Abridgments.

Another part of the invention consists in improvements in railway carriages. Each carriage is divided into two compartments, "one-fourth for first-class passengers, and three-fourths for second-class passengers. There is a passage between the seats, and the entrance doors are at each end. The first-class compartment is partitioned off by light sliding glass doors and curtains; the interior is divided also by light sliding glass doors into compartments large enough to receive five strong portable easy study chairs, each with a small table at the right arm large enough to support a small book or sheet of note paper. By means of the sliding partitions, two or more compartments may be thrown into one. The second-class seats will not be partitioned off from the alley, but will have revolving backs, so that passengers may always face (if they so wish) the direction in which they are going. The carriages will be united by folding trap bridges, and a hand rail of elastic rope, or tubes of metal sliding into each other like the joints of a telescope. By this arrangement the most aged or infirm person, if able to walk upon the ground, may with equal ease walk along the train in motion."

Another part of the invention consists in "constructing and working railway carriages for receiving and leaving passengers at stations, and for conveying them to and from trains without stopping." According to this part of the invention each such carriage is divided into first, second, and third-class divisions, without seats, two small compartments at the forward end affording room for luggage and a windlass. The latter is to be worked by a "moveable belt attachment from the forward axle of the carriage," and is furnished with a hand break, "and in order to transfer passengers to and from a train in motion, as a train approaches a station, the carriage above-mentioned, containing passengers and luggage intended for the station, is disconnected and left to run by its own velocity to a side track under care of the breaksmen. As the train proceeds, a strong plank suspended from the floor of every carriage, a little above the height of the



" rails, and covered on the under side with leather, gutta percha, " or other slightly yielding substance, rubs upon the outer rim of " a driving wheel," which, being thus put in motion, causes a conical drum, upon which a rope is wound, to bring up a carriage similar to that already described, and containing passengers and luggage, this carriage being gradually brought to the rear of the train, and connected thereto by a hook and other apparatus, and the passengers and luggage being then transferred to the other carriages of the train. The break already mentioned prevents any shock being given to the carriage on being taken in tow by the train, and such passengers as mean to stop at the next station then enter this carriage, which, in its turn will be left at such station.

[Printed, 4d. No Drawings.]

A.D. 1860, September 6.—No 2151.

DAVIES, JOHN.—(*Provisional protection only.*)—" An improved " application of material to the manufacture of coupling apparatus to be employed in connecting locomotive engines, tenders, " and carriages together upon railways."

This invention consists in constructing the couplings of railway engines, tenders, and carriages, including the coupling links, shackling irons, hooks, draw bars, and coupling chains, together with the " other connections to which they are or may be " attached," of steel, such steel being whatever peculiar manufacture may be found best adapted to the purpose " in order to " insure such and all parts of 'coupling apparatus' for railway " purposes being of the utmost attainable tensile strength."

[Printed, 4d. No Drawings.]

A.D. 1860, September 14.—No 2223.

BURDESS, ADAM.—"Improvements in railway brakes."

This invention relates to those railway brakes "which take " effect by the momentum of the carriages of a train, and a " resisting force applied either by the engine, or it may be by " concussion or otherwise," and it consists of an arrangement of parts "receiving motion from the buffer rods and transmitting it " through a lever (or levers), the fulcrum or point of resistance of " such lever being subject to the action of a spring or resilient " force, which yields on any violent force being applied

“ through the buffer rod, but at same time continues to press up  
“ the brake to the wheel with the requisite force. The spring  
“ so acting as the resisting force of the brake may be disposed  
“ between the two brakes of two adjoining wheels, so that one  
“ offers force of resistance for the other. This is readily effected  
“ by mounting the fulcrum of the pendant brake levers on two  
“ rods in line with each other, or nearly so, with the springs  
“ between them,” or the brake surfaces and levers, “ instead of  
“ being so arranged, may be arranged in the ordinary manner,  
“ with an equal armed lever mounted between the brakes and  
“ connected with each by a rod ” there being in connection  
with this “ equal armed lever ” another lever “ to receive the  
“ impulse from the buffer rod,” the axis of this other lever  
being carried by “ a slide or box, which is subject to the action of  
“ a spring as the resisting power on which the action of the  
“ brakes depend. The spring so applied is such as to give way  
“ to any violent or excessive pressure, but at the same time offers  
“ sufficient resistance to keep the brakes up to the wheels with  
“ the force desired. When the whole of the brakes are thus  
“ arranged they are to a certain extent within the control of the  
“ engine driver, as, if he desires to stop a train suddenly he  
“ reverses his engine and applies his brake, which offers an  
“ opposing force to the momentum of the train and drives in the  
“ buffer rods to a certain extent, and therefore applies with more  
“ or less force the brakes of the several carriages of the train.”

The buffer rods are made to act upon the brake apparatus through the medium of cleets or catches with which they are provided, these cleets or catches being mounted on pivots, and capable of being moved by means of sliding bars furnished with handles, which may be so combined with levers and other subordinate mechanism that by pulling at one handle all the catches or cleets of a carriage may be placed in such a position that the buffer rods may be pushed inwards without the brakes being acted upon, and thus a train of carriages may be placed in a condition which will admit of such train being “ backed ” with facility, and without opposition from the brakes.

[Printed, 1s. Drawings.]

A.D. 1860, September 24.—N° 2320.

PARSONS, GEORGE.—(*Provisional protection only.*)—“ Certain  
“ improvements in breaks for railway carriages.”

According to these improvements the inventor fixes a break wheel or break wheels on one of the axles of a railway carriage, and passes round such wheel or wheels "a friction band or its equivalent, one end of which is connected to a spring; the other end passes through a slot in the said band, and is then connected by a chain or otherwise to a band passing over a break wheel or wheels fixed on the next axle of the carriage. The end of the last-mentioned band is connected with the guard's break in the ordinary manner, or by means of a coupling with breaks on the same arrangement on every carriage in the train. When the breaks are connected from one carriage to another" the inventor sometimes, in addition to the ordinary coupling, connects "the end of the band from one carriage with the end of a lever suspended from a joint on the end of a frame of the carriage next contiguous in the train, and where the said levers cross each other between the carriages" he connects them by "a pin passing through a slot near their centres," and in order "to keep the bands from resting on the break wheels when the breaks are not in use the said bands are suspended from the carriage framing by a spring or by other suitable means."

Breaks thus constructed, whether "used with single carriages or continuously throughout the train, may be operated upon by the guard from his own carriage in the ordinary manner."

[Printed, *ed.* No Drawings.]

A.D. 1860, September 25.—N° 2326. (\* \*)

HAWORTH, JOHN.—"Improvements in tramways for streets and ordinary roads, and in carriages for running thereon."

One portion of this invention consists "in placing a grooved intermediate rail between the two rails on which the wheels of the carriage run. The rails for the carriage wheels are made of rolled T-shaped iron, and the three rails are attached to grooved longitudinal dovetailed wood sleepers: these improved tram rails are or may be on the same level as the other portions of the street or road in which they are laid."

The improvement in carriages consists in the application of a pulley or disc to each carriage meant to travel along a street or way, furnished with rails as described above, and which pulley or disc works in the groove of the intermediate rail, and prevents the

other wheels of the vehicle from leaving the outer rails, which, as mentioned above, are on a level with the rest of the street or road. When it is desirable that the vehicle should leave those rails, however, as when turning a corner of a road, the pulley or disc is raised out of the groove in the central rail by means of a spring, a weighted lever, a treadle, or other suitable apparatus, being mounted in moveable framework which may be operated upon by such spring, lever, treadle, or other apparatus, as requisite.

[Printed, 1s. Drawings.]

A.D. 1860, September 25.—N° 2327.

PORTER, JOHN ROBINSON.—(*A communication from Henry Porter and William Edward Jones.*)—(*Provisional protection only.*)—“Improvements in axles for railway carriages and other purposes.”

This invention has reference to the axles of locomotive engines as well as railway carriages, and is particularly applicable when these “are required to travel on curves of small radius, and also “generally to other cases or purposes in which two wheels being “fixed on one axle one of them is required to travel at a velocity “different from the other,” and the invention consists “in the “arrangement of an improved coupling for maintaining the “gauge of the wheels, and an adjustment against wear and “tear.”

The axle is formed in two parts, there being keyed on the inner end of one part a cylindrical coupling box, one portion of which projects beyond such inner end, and contains a hollow bearing of conical figure, into which the inner end of the other part of the axle is inserted, such end being so shaped as to fit the conical bearing, in which it is capable of revolving freely, being kept in its place by a ring or projection inside the coupling box, which enters a groove formed in that part next the portion which works in the conical bearing. In the smaller part of the latter a sort of plug or end bearing is arranged, the position of which may be altered by means of gibs or cotters as the parts become worn.

The invention is mentioned as being applicable to the shafts of screw steamboats “for stopping the motion of the screw without “stopping the engines, and to other machinery when a similar “application would be desirable.”

[Printed, 8d. Drawing.]

A.D. 1860, September 27.—N° 2347.

**JOHNSON, JOHN HENRY.** — (*A communication from Messrs. H. Petin, Gaudet and Company.*)—"Improvements in forging and rolling metals, applicable to the manufacture of wheels, spades, shovels, axles, buffers, and other articles of wrought iron."

This invention "relates to a peculiar system or mode of shaping metals by forging and rolling the same, which system or mode may be advantageously employed in the manufacture of railway wheels and axles, buffer heads, door hinges, the frames or holders for break blocks, break levers, guard plates, shovels, spades, trowels, scythes, and in general all articles of a symmetrical form."

In carrying out the invention "it is proposed to employ suitably constructed rolls, according to the shape of the article to be produced, which rolls have a progressive alternating motion imparted to them, in lieu of a continuous rotatory motion, as heretofore. This progressive alternating motion is derived from a vibrating lever keyed on to a rocking shaft, which also carries a large spur wheel for transmitting its motion to the gearing of the rolls. The vibrating lever is actuated by a rotating crank and connecting rod, and the gradual progressive motion of the rolls is obtained by increasing gradually the throw or stroke of the vibrating lever. This may be accomplished by connecting the end of the connecting rod to a nut working on a screw spindle which extends along the lever, and which is rotated a certain amount at each stroke by a pair of bevel wheels and a reversing pall and spur wheel, the direction of rotation of the screw depending upon the position of the pall. As the nut travels towards or from the free end of the lever it follows that the stroke of such lever will be gradually diminished or increased, the lever being thereby vertically lengthened or shortened; and this variation of motion is imparted in a proportionate degree to the rolls, which receive a partial circular reciprocating motion on their axles, but which motion gradually increases in extent at each stroke."

The invention is described in detail at some length, and as applied, in the first place, to "the manufacture of a solid railway wheel, that is to say, a wheel made without arms or spokes," different modes of carrying out this part of the invention being set forth. And the invention is further illustrated as regards its



application to the formation of axles, hinges for carriages and waggon, guard plates, spades and shovels, scythes and trowels. In order fully to understand the details of the invention, however, an inspection of the Drawings annexed to the Specification will be necessary.

[Printed, 1s. Drawing.]

A.D. 1860, October 8.—N<sup>o</sup> 2428.

HENSON, JAMES.—(*Provisional protection only.*)—"Improvements in the manufacture of chains for coupling or connecting the carriages, wagons, and other vehicles on railways, applicable also to various other purposes."

This invention consists "in forming chain of flat, or flat and half round, or other shaped plates of either iron or steel, or of both, with rivets only, or rivets and screws, made of either of the same materials. The end and side edges of the plates intended to form the chain may be left either square or rounded, as may be most desirable, for the practical application of the same. All the holes intended to receive the pins, bolts, or screws for the purpose of connecting the link plates should be drilled, as the process of punching is apt to injure the metal. The chain may be made of any number, thickness, and shape of link plates suitable to the purpose for which the chain is to be used. For connecting railway carriages and wagons the chain may be secured to the end piece of each carriage or wagon frame, either by a suitably formed hook and shackle or either a hooked plate link and rivet with shoulder, or pin with collar, or with a bolt, to be attached and passed through the hole in the link plate left for that purpose, and secured by a key. By the latter means the chain will present a uniform appearance, care being taken that in all the parts equality of strength is attained. Or the connection between the carriages may take place by any other suitable mechanical means." In order to make a chain of great strength the inventor takes two or more rods of iron or steel, and twists them together, "and at the part to be welded or joined together for the purpose of forming the links, whether made of one only or more rods of iron," he causes "a piece of steel of any section or length suitable for the purpose to be welded or incorporated with the metal intended to form the links of the chain, thus what is called breaking the joint or greatly adding to the strength of the weld, and conse-



"quently of each link intended to form the chain." And in some cases he makes "an indentation or longitudinal groove or cavity" by the process of rolling the iron intended to receive the piece "of steel, to be either incorporated with the part welded on the outside or the inside of the link; or the piece of steel rod or bar may be laid in the groove or cavity of the same length as the piece of iron intended to form the link. The piece of steel rod or bar may be laid in on the inside only of the iron link, thereby securing a harder wearing surface of the links forming the chain."

The inventor mentions that it is evident that this improved chain "is applicable to a variety of purposes."

[Printed, 4d. No Drawings.]

A.D. 1860, October 8.—N° 2435.

NEWTON, WILLIAM EDWARD.—(*A communication from John E. Jerrold, John Eugene Beggs, and Francis Scott.*)—(*Provisional protection only.*)—"Certain improvements in springs for railroad cars, locomotives, and carriages."

One part of this invention consists in the use of "a closely wound coil made of one continuous or of several thin strips of sheet steel or other suitable material," for the purpose of producing a spring suitable for railway engines and carriages, such coil being retained in form by two clamps, which are provided with pivots, and form the guides for the spring.

Another part of the invention consists in combining with this coil a band, the sides of which form the guides for the clamps, and which band is so proportioned in relation to the coil that it checks the motion of the spring beyond a certain limit.

[Printed, 4d. No Drawings.]

A.D. 1860, October 8.—N° 2441.

JOHNSON, JOHN HENRY.—(*A communication from William Wharton, junior.*)—"Improvements in railways or tramways, and in carriage wheels to be used thereon."

This invention relates to a peculiar construction and arrangement of railways and carriage wheels intended to run thereon, whereby the carriages are rendered self-transferring from the main line to a siding or branch without the use of turntables or move-

able points. The latter, in fact, remain always open, and in conjunction with them is laid a guide rail, so disposed that by imparting a lateral thrust to the wheels of the carriage which it is desired to transfer to the siding or branch, those wheels will be caused to leave the main line and enter the branch line.

In carrying out the invention it is proposed to make those wheels of the carriage which work on the side of the line next to the guide rail of a greater width than usual, so that as they pass the guide rail (which should stand higher than the ordinary rail) they will be forced by it laterally into the branch, the flanges of the wheels passing the open points. The guide rail may be placed either inside or outside of the ordinary rails, and the wheels to be acted upon by them may have annular projections or rims formed upon them; or special wheels may be prepared for the guide wheels to act upon. The carriages which are not required to leave the main line are provided with wheels of the ordinary character, which will not be acted upon by the guide rails.

The details of the invention are very fully set forth.

[Printed, 8d. Drawing.]

A.D. 1860, October 10.—N<sup>o</sup> 2471.

WHITBY, TIMOTHY, and DEMPSEY, WILLIAM.—“Improvements in applying railway springs to railway trucks, and to railway and other carriages.”

According to this invention “the horns between which the brasses or bearings of the axles slide, in place of being in a vertical position, are fixed in an inclined position, and the springs are arranged to act in a line parallel with the inclined direction of the horns. The springs may be applied above or below the brasses or bearings of the axles, or both above and below.” The patentees mention that the construction of spring which it is preferred to employ in carrying out the invention “is such as are wound into spiral and conical forms,” but that other constructions of springs may be used.

The particular object of the invention is not mentioned.

[Printed, 6d. Drawing.]

A.D. 1860, October 13.—N<sup>o</sup> 2495.

CLARK, WILLIAM.—(*A communication from Napoléon Jourdan.*)—(*Provisional protection only.*)—“Improvements in lubricating apparatus.”

This invention relates to a new and peculiar arrangement of oil box for railway carriages, "which lubricates in a self-acting and "continuous manner the whole extent of the journal of the axle," such oil box being also applicable to the lubrication of axles and shafts in general. The peculiarity of the invention consists "in "the application to the two extremities of the journal of a throated "disc furnished with concave spaces or spatulas, which, while "participating in the rotary motion of the journal, take up the "oil contained in the reservoir of the box," and throw it into a cavity made in the bearing for the purpose, the oil thence running upon the journal through conducting holes which communicate with distributing grooves, spreading the oil equally throughout the surface of the journal. "The oil may also be made, by a "peculiar arrangement of discs, to run on to the axle journal "direct, instead of from the bearing."

The details of the invention are very clearly set forth, there being a second reservoir below that already mentioned, "for the "purpose of facilitating the exit of the dirty oil when cleaning "the box," the second reservoir being opened and closed by means of a screw plug.

[Printed, 6d. Drawing.]

A.D. 1860, October 18.—N° 2543.

NEWTON, ALFRED VINCENT.—(*A communication from Thomas Castor.*)—"Improvements in the construction of passenger carriages."

This invention relates more particularly to carriages for "city "railroads;" and consists, firstly, in a novel mode of constructing the seats for the roof, and applying them to and arranging them on the carriage, whereby the usual light materials may be used for the roof, and the latter be at the same time so strengthened as to "sustain the weight of outside passengers while walking to "and fro over it." This effected by the use of a frame resembling an ordinary truss frame girder, which is so contrived as to rest mainly on the ends of the body of the carriage, this frame sustaining the roof seats, and the roof of the carriage itself being composed of the ordinary light materials, but being strengthened by bolts passing through the frame. A light frame is also provided for the purpose of sustaining an awning over the carriage when desired, and the top of the carriage is surrounded by a light railing.

Another part of the invention consists in the employment of a "detachable spiral ladder," by which passengers may ascend to and descend from the roof of the carriage, such ladder being removeable from one end of the carriage to the other, and forming the means of communication between certain platforms and certain overhanging parts of the roof of such carriage.

Another part of the invention consists in the application of certain guards composed of iron framework and wire netting, for the purpose of protecting passengers from accident when ascending to or descending from the vehicle, such guards extending along the sides of the vehicle outside the wheels, and being capable of being raised or lowered by apparatus which may be brought into action by the foot of the driver.

[Printed, 10d. Drawing.]

A.D. 1860, October 23.—N° 2581.

WILSON, EDWARD BROWN.—(*Provisional protection only.*)—

"Improvements in wheels for railway purposes."

This invention consists "in the manufacture of wheels for railway purposes from solid cast steel."

"The production of these wheels may be effected in various ways, but the novelty of the invention consists, as above stated, in the manufacture of wheels for railway purposes of solid cast steel."

[Printed, 1d. No Drawings.]

A.D. 1860, October 24.—N° 2594.

McINNES, JOHN.—"Improvements in machinery, apparatus, or means for actuating or working railway brakes."

This invention relates to a mode of actuating railway brakes "by means of a systematic arrangement of fluid pressure cylinders, placed upon the whole or upon a portion of the carriages or vehicles composing a train, and contrived to be actuated in concert."

The details of the invention may be varied, but arrangements are described in which the tender of the train, or one of the carriages of such train, is provided with a reservoir, into which air is continually forced by a pump which is worked by an eccentric fixed upon one of the axles of the tender, this reservoir communicating by means of suitable pipes with cylinders placed below the

bodies of the different carriages of the train, these cylinder having within them pistons, the rods of which are connected to levers by which brake apparatus of the ordinary character is brought into action upon the wheels of the carriages upon the opening of a valve which permits compressed air to pass from the reservoir to the cylinders, such air then forcing the pistons in one direction and causing the brakes to operate, the latter, again, being caused to cease acting by closing the valve mentioned above when the brakes are removed from the wheels by weighted levers.

The apparatus may in other arrangements be worked from the brake van or one of the carriages or waggons of the train, and in some cases separate sets of apparatus may be worked from different parts of a train. And the compressing pump may be worked by a donkey engine instead of by an eccentric on one of the axles, and may be provided with an indicator to show the pressure of the air in the reservoir. The engine or pump may also be provided with apparatus by which the working of the pump may be regulated, or stopped altogether, or a piston or diaphragm may be arranged as to be so acted upon by the compressed air as to throw the pump out of gear upon a certain pressure of air being attained, and into gear again upon such pressure being reduced.

The invention includes various arrangements of valves, diaphragms, and other contrivances for regulating the action of the parts, and preventing leakage from or the access of dust to such parts.

[Printed, 10d. Drawing.]

A.D. 1860, October 25.—N<sup>o</sup> 2601.

**RICHARDS, JOHN.**—(*Provisional protection only.*)—"A new or  
" improved break for arresting or stopping carriages or trucks on  
" inclines, when by the breaking of coupling links or other acci-  
" dent the said carriages or trucks are in danger of running down  
" the said inclines."

This invention is thus set forth :—

" On one of the wheel axles of the carriage or truck a cast or  
" wrought-iron disc is keyed, the said disc having a portion of  
" its periphery cut away so as to form a large tooth similar to the  
" tooth of a ratchet wheel. A spindle turning in brackets on the  
" under side of the carriage or truck carries at one end an arm,  
" the end of which said arm is turned so as to make a right angle



“ with the said arm. The hooked end or catch of the arm is situated immediately over the before-mentioned disc. The said arm is so connected to its spindle as to allow sufficient ‘rise’ to clear the depth of the tooth on the disc without moving the said spindle. At the other end of the spindle is a lever working against the side of the carriage or truck, under an iron guard. By means of the said lever the hooked end or catch of the arm may be thrown out of gear. On the two-wheel axles of the carriage or truck discs having teeth in opposite directions may be placed, and suitable catches provided to engage with these discs respectively. By connecting the levers of the two catches one or other of the said catches may be thrown into gear, or both of them may be thrown out of gear with their respective discs. By this arrangement the carriage or truck may be prevented from moving in either direction as required without turning the said carriage or truck.” The action of the apparatus is so “that one of the catches is thrown into gear, which will allow of the rotation under it of its disc in the direction in which the wheel axle is required to move. The catch rests upon the periphery of the disc, and when the carriage or truck moves in the proper direction the tooth on the disc passes under the catch without obstruction, but when, by the breaking of a coupling, or otherwise, the carriage or truck commences to move in the opposite direction or backwards, the catch engages with the tooth, and thus preventing the rotation of the wheel axle brings the carriage or truck immediately to rest.”

[Printed, 4d. No Drawings.]

A.D. 1860, October 26.—N<sup>o</sup> 2619.

**PRENTISS, ELIJAH FREEMAN.**—“Improvements in cars or carriages to run on street railways or tramways.”

One part of this invention consists in supporting the top of the carriage by means of angular struts, which abut at one end against the side framing, and bear at the upper end against the king post, and support a horizontal bar on which are placed cross bars for the support of the roof seats. From the cross bars also descend struts which assist in supporting the footboard of the roof seats. The side framing is held together by tie rods, “so that the roof is supported upon the bow and string principle.”



The roof seats, with the footboard, the cross bars, and the struts, are so arranged as to be removeable at pleasure.

Another part of the invention relates to a mode of strengthening the lower part of the carriage, and consists in the employment of a "hog chain," whereby the ends of the carriage are held together, such hog chain being supported at the centre by a post or standard, and the ends passing through and being screwed up against the under sides of the side beams of the lower part of the vehicle. The seats are supported by narrow vertical standards which rest upon the side beams, or upon the floor of the carriage, and the "concaves" or outer parts of the carriage below the seats are constructed of thin wood covered with a layer or layers of canvas, this part of the vehicle being thus rendered very light.

Another part of the invention relates to the mode of adapting the pole to the carriage which is connected to the under framing of the latter by means of two vertical swivel pins, these allowing the pole to be turned horizontally without turning the carriage, the pole being moreover supported by struts which allow it a certain amount of vertical motion, so that the depression of the body of the carriage upon the springs, when loaded, will not cause the pole to bear with undue weight upon the horses' backs.

Another part of the invention consists in constructing carriage wheels each of one thin metallic disc, concave on both sides, but with a nave projecting on one side beyond the breadth of the wheel rim, the disc being strengthened by radial ribs cast on one or both sides, and the rim being furnished with a guiding flange.

Another improvement relates to the axle box, and consists in adapting a sliding piece to the upper part of the box, this being fitted to relieve the bearing of the axle. The end of the box is provided with a moveable cover, and by taking off this cover and then drawing out the sliding piece the bearing may be taken out and replaced with facility. A modification of this arrangement consists in causing the bearing to rest against a fixed round stud cast on the inside of the box, and when it is necessary to take out the bearing the packing of the box must be loosened and the axle allowed to descend sufficiently to allow of the bearing being removed.

Another improvement relates to carriage lamps, and consists in furnishing them with double reflectors, "so that the light of the lamp may be reflected forward and backward."

[Printed, 1s. Drawings.]

A.D. 1860, October 27.—N° 2620.

HATHAWAY, CHARLES.—“Improvements in the construction of street railways, and in the wheels to run thereon.”

According to this invention the working surfaces of the rails of street railways are made “with double treads at different levels, one being intended for the flanged wheels of the street railway cars, and the other for the wheels of ordinary carriages.” Different modifications of these rails are described, and different modes of connecting them together and to their sleepers or other supports. When such rails are formed of cast iron the working surfaces may be chilled, to render them more durable. The rails may also be double-headed, so that when one surface has been worn out the rail may be turned over and present a fresh working surface. The patentee states that it is important to notice that the flanges of the cars are made less than half an inch in depth, and that the difference in level of the two lines of tread in the compound rail is little more than one quarter of an inch; consequently ordinary carriages, when obliged to cross the track, will not be subjected to a severe shock or jar, as at present. When only a single line is laid in a street, or when a branch line is made to run into a single track certain “turn-outs” and fixed points are so arranged as to enable carriages on a single line to pass each other, or to turn out of the main line into the branch line, all these particulars being fully set forth.

That part of the invention which relates to the wheels for working upon these rails consists essentially in “making the flanges of some of the wheels of an extra thickness, leaving the others with thin flanges, or flanges of the ordinary thickness, the track and turnout being made with grooves, cutters, or rails to correspond,” and the patentee states that this arrangement “will be found exceedingly convenient when it is desired to run on the same track some carriages that will be required to turn out or diverge at a certain point, while other carriages will continue straight on,” the arrangement of rails and points being such that those carriages with the thickened wheels diverge while the others do not do so. He also states that wheels of the ordinary thickness may be caused to diverge at such points as may be requisite by there being adapted to each of such wheels a “side shoe or diverging point,” such shoe or point being formed or fixed on the end of a lever, which is suspended from the axle of the wheel,

and capable of being raised and lowered by means of a bell-crank, hand lever, and link.

[Printed, 10d. Drawing.]

A.D. 1860, October 29.—N° 2648.

CLARK, WILLIAM.—(*A communication from Antoine Grivel, junior.*)—"Improvements in railway brake apparatus."

This invention "relates to a shoe chock or skid brake, which  
" may be supported, for example, by the grease boxes or axles  
" of the rear carriage of a train for acting automatically on the  
" wheels in case either of the coupling chains should break, so  
" that if a train be ascending an incline the part of the train  
" detached from the engine will remain stationary on the line  
" instead of running backwards."

An arrangement is described in which a skid brake is placed behind each wheel of a carriage, those of each pair of wheels being connected by arms to a shaft mounted in suitable bearings, and there being on each shaft a forked lever, and these forked levers being connected by means of rods and a certain double lever and chain to the coupling apparatus of the carriage, the result of the arrangement being that so long as the coupling apparatus is in action the skid brakes are raised into such a position as to have no effect upon the wheels, but are allowed to descend on the coupling apparatus failing or ceasing to operate, and so prevent any backward motion of the carriage, or of any carriages which may be in front of it. The skid brakes are composed of ironwork lined with wood. In order to allow of a train being backed, a certain bent lever is connected with the apparatus, which may be so operated by a screw or otherwise as to keep the brakes raised during such backing.

[Printed, 6d. Drawing.]

A.D. 1860, October 29.—N° 2649.

HENRY, MICHAEL.—(*A communication from Pierre Sabatier and Nicolas Theophile Deyeux.*)—"An improved method of manufacturing railway wheel tyres and other articles of steel."

According to this invention tyres and other articles are manufactured by melting the metal of which they are to be composed in a crucible or melting pot, "the internal shape of which is the

" same as or corresponds to the intended shape of the tyre or article to be produced, and this crucible is placed in a furnace, and the metal melted into shape and cooled down therein," the crucible being then broken, in order to remove therefrom the tyre or article so produced. " The crucible thus serves not only as a melting pot, but as a mould." In some cases, however, in which it is thought desirable to subject an article to the processes of hammering and rolling, the casting is made of such size as to allow for the effect of such hammering and rolling.

In carrying the invention into effect, furnaces of various kinds may be used, but an arrangement is described in which a chamber for receiving the crucible is placed between two or three chambers or furnaces, which are kept during the process full of fuel, the latter being fed in at the top of such chambers or furnaces, and falling down upon fire bars, on which it burns, and whence the products of combustion pass to the crucible chamber, by which means the fuel is kept from contact with the crucible. There are removable covers to the chambers, and to the crucible, and other requisite conveniences. The patentee states that the arrangements described allow of " inferior fuel " being used, and thus coal may be mixed with the coke usually employed; also that the crucible " can be annealed in this furnace."

The crucible itself is composed of refractory clay or refractory earth, and although each crucible is broken after one casting has been made in it, the materials may be cleansed and used in the formation of other crucibles. The metal employed may be mixed with a flux or otherwise. The details of the invention are minutely set forth, and the patentee mentions particularly, as forming one branch of the invention, " the employment of annular crucibles " for the production of railway wheel tyres and other annular " articles."

[Printed, 4d. Drawing.]

A.D. 1860, October 31.—N<sup>o</sup> 2664.

DAVIES, GEORGE.—(*A communication from Isaac P. Wendell.*)—" Improvements in boxes for railway carriage axles and other shafts."

According to one part of this invention the exterior of the body of the axle box is furnished with the usual guides adapted to the hangers of the carriage frame, the lower portion of the box



forming the receptacle for lubricating matter. "Fitting against the arched interior of the top of the box are two bearing pieces, divided by a separating lug projecting from the centre of the arched interior, and retained in their proper position by keys placed below the same, one at each side of the axle. The keys bear against the sides of the box, and also against ledges or projections therefrom at the top and bottom. The bearings are kept in their proper longitudinal position in front by lips projecting from the arched interior, and at the back by bearing against the end of the box," there being at the front of the box a cover plate." "It will thus be seen that by removing the cover plate and the keys the bearing pieces can at any time be readily removed and replaced or renewed."

According to another part of the invention a chamber is formed at the rear of the axle box, having an opening therein large enough to admit the thick part of the axle, which passes through it, there being within this chamber and surrounding the thick part of the axle, an annular washer of leather (or other suitable material) made of two pieces, rivetted or otherwise fastened together, and forming a packing which prevents the escape of lubricating material from the box; a curved "strap bolt," one part of which is wedge-formed, and a certain curved strip of metal, being used to regulate the position of the packing washer, the two ends of the strap bolt passing through a "follower" mounted above the axle.

Another part of the invention consists in constructing a hanger for ordinary shafting as follows:—"The body of the box is constructed with a recess at each end for the reception of a packing ring, strap bolt, and follower, arranged substantially as above described."

"At about the centre of the lower part of the box, and projecting from one side of the same, is an oil reservoir, which communicates with a recess formed in the box for the reception of a collar on the shaft, which dips into the oil and serves the purpose of dispersing the same throughout the bearing, the packing arrangement preventing the oil from escaping at the ends of the box."

The details of the invention are minutely described, and various advantages mentioned as arising from the arrangements set forth.

[Printed, 8d. Drawing.]

A.D. 1860, November 10.—N° 2768. (\* \*)

WILSON, EDWARD BROWN.—“Improvements in the manufacture of railway wheels, tyres, axles, and points, and crossings, which improvements are also applicable to the manufacture of ordnance, tubes, and metal cylinders generally.”

“In shaping and compressing such articles after they have been cast or forged, by the aid of suitable dies acted upon by hydrostatic pressure.”

[Printed, 4d. No Drawings.]

A.D. 1860, November 14.—N° 2793. (\* \*)

BLAKELY, THEOPHILUS ALEXANDER.—“An improved method of increasing the strength of steel and wrought iron.”

Bars, hoops, and rings of steel or iron, such as are used in the construction of guns, wheel tyres, or for other purposes, are made of increased strength by extending or pulling them out in the direction in which it is desired that they should possess great tensile strength. The bars, hoops, or rings are heated to a “dull red heat,” and the pulling strain is applied until they are cold, or nearly so. The strain may be applied in any convenient way; in the case of rings or hoops expanding mandrils may be used.

[Printed, 4d. No Drawings.]

A.D. 1860, November 16.—N° 2817.

WILSON, EDWARD BROWN.—“Improvements in the manufacture of railway wheels, and other articles of cast steel or malleable cast iron.”

This invention consists “in manufacturing railway disc wheels and other articles of cast steel or of malleable cast iron, by either forging such articles so composed in suitable dies, or by shaping them after they have been cast or forged by the aid of suitable dies acted upon by steam power.”

Different modes of carrying out the invention are described, in one case a “wheel blank” being first cast of sufficient size to allow for contraction, and then operated upon by dies “composed of two parts only,” one of these shaping the inner face, and the other the outer face, tread, and flange of the wheel. In another case the die is composed of three [parts, one of which



shapes the inner face, another the tread and flange, and the third the outer face of the wheel. The patentee also describes "a set of dies for pressing the blooms intended for the manufacture of "armour plates," this set of dies consisting of four pieces, which may be held together when in operation by clamps, and the whole placed in a recess or cavity formed to receive it in a metal bed or block. The "bloom" may either be cast in a separate mould or in the dies themselves.

[Printed, 8d. Drawing.]

A.D. 1860, November 17.—N<sup>o</sup> 2829.

**BLACKBURN, BEWICKE, and CARR, HENRY.**—"Improvements in axle boxes."

This invention consists "in the use of a lubricating pad, so formed that it can be introduced into its place under the journal in a railway axle box of ordinary construction through an aperture small enough to be readily and quickly opened and shut, thus allowing the pad to be drawn out and examined, cleaned, replaced, and renewed expeditiously without the necessity, at present existing, of lifting the carriage, or other slow and operose method of getting at the interior of the axle box."

The pad, and the springs which bear it up against the journal of the axle, are formed in such manner as to "collapse in passing through the narrow aperture (by preference a screw hole) provided for the introduction of the lubricating liquid, and then expand in the box." The pad itself is composed of woollen web, or such web and leather "set edgeways," and a ring or loop or piece of woollen, cotton, or other fibrous material, and attached or not to the spring, descends to the bottom of the box to act as a wick for drawing up the oil or other lubricating material. The parts may be so arranged that by the use of a loose or hinged plate or carrier, "or otherwise," the spring or springs may remain in the axle box when the pad is withdrawn, but the patentees state that it is preferred that the pad "should be fixed to its spring or springs, and that they should be capable of being removed from and introduced into the axle box together."

[Printed, 10d. Drawing.]

A.D. 1860, November 21.—N<sup>o</sup> 2850.

CLARK, WILLIAM. — (*A communication from James Hervey Deming.*)—"Improvements in journal or axle boxes for railway carriages, whereby to effect the better lubrication of the frictional surfaces."

The object of this invention is to ensure a constant supply of oil to the surfaces of the end bearings of railway axles, and the invention consists in the combination, "with the usual end bearing of railroad carriage axles and boxes, of brushes or other projections on the periphery of the journal, and near the end thereof, which in the rotation of the axle shall dip into and carry up the oil or other lubricating liquid from the lower part of the box; and also of a passage way from the upper surface down to and through the centre of the end bearing, so that the oil or other lubricating matter so carried up shall fall on to the upper surface of the end bearing, and run down the passage way to the centre of the bearing end."

The patentee states that by these means "the end bearing is constantly supplied with oil while the carriage is in motion, for although the centrifugal action due to the rotation of the axle constantly carries the oil from the centre to discharge it at the periphery, nevertheless the supply at the centre will be constant, and will keep the end bearing fully supplied."

[Printed, 8d. Drawings.]

A.D. 1860, November 24.—N<sup>o</sup> 2890.

FOX, SAMUEL MICKLE.—"Improvements in rails for railways, and in the wheels of carriages to run thereon, especially adapted to street railways."

This invention consists, in the first place, in an arrangement of tracks whereby a grooved rail may be used as a guide for the cars, and a flat rail for the outer wheel, "so that by placing the two grooved guiding rails as near as convenient to each other in the centre of the street, and the flat rails on the outer sides of the track, there is no obstruction to other vehicles, because the flat rails can be travelled on as well as any blocks of paving stones, while the grooved rails near the centre of the street are out of the way of the respective lines of travel up one side and down the other of the street, and occupy but about two feet

" instead of about fourteen feet, as now used for the track ; and  
 " these grooved rails are no inconvenience in crossing, because a  
 " vehicle would at the centre part of the street pass over these  
 " rails nearly at right angles, or at a sufficient angle to be un-  
 " injured, and the groove is too narrow to admit the tires."

The patentee states, however, that this arrangement of rails would be useless " if the car wheels were all made with flanges," and that he therefore makes the wheels which are to work upon the grooved rails with flanges, while the others, which travel upon the flat rails, are without flanges. He also mentions various inconveniences as attending the usual system of street railways which are avoided by these arrangements.

[Printed, 6d. Drawing.]

A.D. 1860, November 26.—N<sup>o</sup> 2894.

TRAIN, GEORGE FRANCIS. — (*A communication from Ralph Nouell Musgrove.*)—" Improvements applicable to street railway  
 " carriages, part of which are suitable for other purposes."

This invention consists mainly of improvements in the railway omnibuses used on the improved system of street railways for which a Patent was granted to the present patentee, A.D. 1860, April 26th, No. 1,051.

The first part of this invention consists of " an improved rail  
 " clearer, one to be carried in front of each of the leading wheels  
 " of railway cars." This improved rail clearer is composed of a piece of metal or other suitable substance, " having the under side  
 " thereof formed to coincide with the contour of the section of the  
 " rails, and at the front pointed vertically so as to cause it to  
 " remove obstructions either to one side or the other of the rails.  
 " These improved rail clearers are mounted on suitable arms  
 " projecting from the carriage frame, and are carried immediately  
 " above and in close proximity to the rails, a little in advance of  
 " the leading wheels."

The second part of the invention consists in an improved folding seat, which is peculiarly suitable for the drivers or conductors of railway omnibuses, such seat consisting of a flap which is jointed to the side or end of the vehicle in such a manner as to be capable of being folded upwards, a metal rod being connected to or near to the front edge thereof, and being provided with a stop, which on the flap being lowered and the lower part of the

rod passed through a hole in the platform of the vehicle, retains the flap in a horizontal position, the rod resting in a notch formed in a metallic projection when the flap is raised.

Another part of the invention relates to "a peculiar description of spring slide" which is meant to prevent the windows of railway omnibuses and other vehicles from rattling, this slide consisting essentially of a "wedge-sided" piece of metal, which is pressed against two parallel pieces of metal (of which the inner sides are bevilled to receive it) by a helical spring.

Another part of the invention relates to a catch or bolt for the windows and shutters of railway omnibuses and other carriages, this catch or bolt being S-shaped, and actuated by a vertical bar furnished with a small projection which abuts against the under side of the upper curve of the bolt or catch.

Another part of the invention relates to improved catches and handles for the sliding doors of railway omnibuses, or "other sliding screens," this part of the invention consisting of a bent lever working on a transverse axis, the inner arm of the lever projecting upwards, and the lever being fitted into a suitably shaped mortise lock frame or box. The outer end of the lever is formed with a latch hook, and has in one side a recess for the reception of a spring, one end of which rests against the inner side of the back of the lock box, and the other against the upper limb of the lever, this spring depressing the outer end of the lever, on which is the latch hook. A staple of the ordinary kind is used, and the latch is disengaged when necessary by means of handles, which are combined with certain vibrating pieces of metal carrying studs, a vibrating lever, and other mechanism, this part of the invention being set forth at some length.

[Printed, 8d. Drawing.]

A.D. 1860, November 26.—N<sup>o</sup> 2895.

TRAIN, GEORGE FRANCIS.—(*A communication from Messrs. Grice and Long.*)—"Improvements in steam carriages, and the running gear for street and other railways."

This invention relates more particularly to carriages for street and other railways "having sharp curves." The body of the carriage is by preference constructed "of an enclosed oblong form, "having a stage or platform at each end, one of which serves to "enter the vehicle by, and the other to carry the engine and

"boiler," the latter being so formed as to allow the frame of the engine to be brought down almost into contact with the driving wheels. The boiler is placed on one side of this platform, and the engine on the other, leaving a space between them for the engineer. The water tank is placed in the rear of the boiler and engine, or it may be extended lengthwise beneath the seats in the body of the car.

The engine consists of two cylinders, placed at an angle of, say, about  $30^{\circ}$ , the piston rods working through the lower ends thereof, and the connecting rods being coupled to a pair of crank arms on the ends of a transverse toothed or friction pinion shaft, which actuates a large toothed or friction wheel on the axle of the driving wheels of the carriage. Or in place of toothed or friction gear an endless chain band may be used to convey motion from the shaft to the axle.

The hinder part of the carriage, instead of being furnished with an axle and wheels in the ordinary manner, is mounted upon a truck having either one or two pairs of wheels with transverse axles, this truck being connected to the body of the carriage by a vertical pin, which projects through the bottom of the carriage in advance of the truck wheels, and through a hole in the fore part of the truck which is "elongated for the purpose;" or a fixed arm, having a vertical hole through the outer end thereof, may be used, instead of extending the truck frame beyond the running wheels. The truck frame is provided with antifriction rollers so arranged as to form part of a circle, in the centre of which is the vertical pin, and the bottom of the body of the carriage is provided with curved plates which rest upon the rollers, this arrangement allowing the vehicle readily to pass round sharp curves. This system of mounting upon a truck "may be readily adapted to all kinds of railway carriages." When applied to a railway waggon, the body of such waggon is mounted by preference upon two trucks, which may have one pair or two pairs of wheels each, or one be provided with one pair, and the other with two such pairs. "The object in using "two trucks is that the vehicle can be driven either end first," and when drawn by an engine, "the front truck would require "to be locked," while when drawn by a horse or other animal it may be allowed to turn under the body of the vehicle.

To prevent undue vibration at the rear end of a carriage body, a spiral spring is enclosed in a cylinder, a bolt having a large

shoulder passing through the spring, the shoulder resting upon the latter, and the upper end of the bolt carrying an antifriction roller. The spring acts through the bolt, and its antifriction roller upon an inverted double inclined plane secured to the bottom of the carriage body, the apex of the inclined plane being "placed transversely in the centre of the car body, in a line perpendicular to the bolt when the truck to which it is attached is square with the body of the carriage upon a straight track."

[Printed, 10d. Drawing.]

A.D. 1860, December 1.—N° 2946. (\* \*)

GREAVES, HUGH.—"Improvements in the construction of railways, tramways, and in vehicles to run thereon, portions of which improvements are applicable to other useful purposes."

The improvements in vehicles consist in applying, in addition to the ordinary wheels, two or more guide wheels of suitable form, and mounted in suitable frames, and so connected to the body of the vehicle that by "simply depressing or raising them the vehicle may be at pleasure confined to and guided by the rail of fixed gauge, or may be at liberty to leave the track for the purpose of passing other vehicles, or otherwise, which arrangement admits of such vehicles being employed for the double purpose of rail and road traffic when desired." In carrying out this part of the invention the wheels are formed double, each wheel consisting in reality of two separate discs fixed upon the axle a short distance apart, and the guide wheels are placed between them, the bearings of the latter being capable of rising and descending, and the latter being either depressed so as to enter grooves in the rails on which the vehicle may be travelling, or being raised therefrom by levers actuated by the hand of the conductor, or rising and falling without such manipulation as the vehicle is brought upon the grooved rails or upon a level surface respectively. To the fore part of the vehicle bars or scrapers, or revolving brushes are attached, for the purpose of removing stones or other obstructions from the rails.

[Printed, 8d. Drawing.]

A.D. 1860, December 8.—N° 3013.

WHEELER, ARTHUR. — (*Provisional protection only.*)—"Improvements in the manufacture of railway carriages, trucks,



" engines, and other vehicles, so far as the balancing power, springs, and buffers are concerned."

This invention consists in substituting, in place of the springs usually employed in railway carriages, " a series of levers working in connection with one central spring, by which means the carriage and the couplings are balanced, and the great expense of separate springs for the wheels, buffers, and couplings of railway carriages is avoided. In some instances the arrangement of levers may be employed, working without the central spring, the levers being so arranged as to adjust the weight as required. By connecting the brake to a series of levers, the carriage may be almost instantaneously stopped when required."

[Printed, 4d. No Drawings.]

A.D. 1860, December 13.—N° 3072.

ALLEN, WILLIAM DANIEL.—" Improvements in the manufacture of the bearings or 'brasses' in which the axles of locomotive engines and carriages revolve, and also in the bearings, 'brasses,' and other parts of plummer blocks employed in machinery generally."

This invention is described at some length, but it consists essentially in forming the bearings of railway engine or carriage axles, as well as the bearings and other parts of the plummer blocks employed in machinery in general, by rolling the metal used to form such bearings and other articles, instead of forming them by casting such metal in moulds.

The invention is set forth as consisting more particularly in forming these bearings and other articles " by rolling billets or ingots of malleable iron or steel, or iron and steel combined, in suitable grooved rollers, and forming thereby bars of such a sectional form as will, when cut into suitable lengths," produce the articles required, and which articles may be finished by notching, planing, boring, or turning; or the form of the bars may be such that by curving, bending, stamping, or pressing the aforesaid pieces of rolled bars, or by forming flanges thereon by means of dies or swages, the desired form and configuration may be given.

Bearings thus formed may be hardened by any of the processes usually adopted for hardening metals, but the patentee

thus sets forth the means he prefers to employ for this purpose:—"In making the bar I take a billet of iron or mild steel, and on to one or both sides of it I weld a piece of steel of such a thickness as will give the required thickness of hardening surface to the finished article; or I take a bar or billet of iron, or of mild steel that will not harden sufficiently, and I convert the external surface of it into steel or into more highly carbonized steel by cementation, and then proceed to roll it into the desired form; or I first complete the rolling of the bars, and in some cases the making of the bearings, and then convert their surface into steel by cementation; when the hardening process is to be dispensed with I prefer to form the said bearings of a very highly carbonized steel, and in all cases I prefer to cut the rolled bars into the desired lengths by sawing or shearing whilst in a heated state, although this process may be effected after they have become cold; the kind of steel employed for the above purposes may be varied, but I prefer to employ cast steel."

In cases in which it may be desirable that bearings shall be furnished with a white metal or tin surface or lining, they may be coated with such metals in the ordinary manner. The details of the invention are very fully set forth with the aid of a Drawing annexed to the Specification, in which, among other Figures, are several representing dies or swages suitable for producing or finishing the articles, or parts of the articles, required.

[Printed, *See* Drawings.]

A.D. 1860, December 14.—N<sup>o</sup> 3074.

FENTON, JAMES.—(*Provisional protection only.*)—"An improved method of securing the wearing tyres on wheels."

This invention "is intended to apply chiefly to railway wheel tyres, and consists in hollowing out or cutting away a portion from the inner side of the inner tyre, sole, or felloe, and on the outer edge of the wheel, the line left by the removal of a part of such portion being parallel with the edge of the inner tyre or felloe and a part inclined, or the whole may be inclined." The outer edge of the wearing tyre is then so formed as to "overhang and fit under the outer edge of the inner tyre or felloe," this overhanging portion being at intervals indented and "set up

"into the part removed from the inner tyre or felloe," as mentioned above.

[Printed, *ed.* No Drawings.]

A.D. 1860, December 17.—N° 3095.

**BODMER, RUDOLPH.**—(*A communication from Gioranni Pagliari.*)—(*Provisional protection only.*)—"Improvements in machinery or apparatus for preventing or modifying the effects of collisions on railways."

This invention refers to a method of connecting the locomotive engine with its tender, "and consists of a strong plate or bar made of metal, or of wood lined with metal, which is attached to the framing of the engine by means of the coupling chains. In coupling the tender and engine together, this plate, which is perforated in three or other desirable number of places, is inserted in a groove or slot cut out for this purpose in the framing of the tender, whereupon three or other corresponding number of strong iron pins or bolts, which are united together at the top by a cross bar, are passed through the holes in the said plate, and through corresponding holes in the framework of the tender by raising a lever, the short end of which acts upon the cross bar through a link."

In the event of a collision between two trains becoming imminent, the engine-driver or fireman (having previously retreated to the tender) depresses the lever and raises the pins or bolts out of the holes in the plate, thereby detaching the engine from the tender, the engine then running forward in advance of the train, and thus in the event of two trains approaching each other, the engines, being detached, would alone come into collision, a strong bar, mounted in a socket in connection with the frame of each tender, being at the same time released and allowed to drop down, such bar being "intended to act as a brake to the wheels as well as to be instrumental in arresting the further progress of the train by ploughing up the ballast. Besides this, it is intended to connect the tender with a slide valve on the top of the boiler of a locomotive engine by means of a rod or chain in such a manner that at the moment of the engine becoming detached from the tender this slide valve shall be opened and the steam allowed to escape, so as to insure the speedy exhaustion of the motive power."

" A detaching apparatus, similar to the one herein described  
 " may be applied to any or all of the carriages of a train, should  
 " this be considered necessary or desirable."

[Printed, 4d. No Drawings.]

A.D. 1860, December 19.—N° 3115. (\* \*)

MCGAULEY, JAMES WILLIAM.—(*Provisional protection only.*)  
 " Improvements in means or apparatus for preventing collisions  
 " on railways."

This invention "has for its object the prevention of collisions  
 " on railways by shutting off the steam while the locomotive  
 " engine is in motion, not by any connection with or direction  
 " given to those on the engine or in the train, but by means of  
 " an inclined plane, inclined planes, or other suitable contrivances  
 " placed between, on, or near the rails of the railway," which  
 " acting upon other machinery or apparatus attached to the loco-  
 " motive engine, cuts off the steam as the locomotive passes said  
 " inclined plane, inclined planes, or other suitable contrivances."

" The machinery attached to the locomotive engine for the  
 " purpose consists of levers, rods, or any suitable apparatus,  
 " which being raised or moved by said inclined plane, inclined  
 " planes, or other suitable contrivances, moves the regulator by  
 " means of a rack and segment or other suitable contrivance, and  
 " thus shuts off the steam, thereby causing the train, whatever  
 " may be the rate at which it is moving, to be immediately  
 " arrested in its progress."

When the inclined plane or planes or other suitable contrivances  
 are required to act they are caused to do so by means of eccentrics  
 or other appropriate mechanism, which may be moved by a  
 handle or otherwise; or such plane or planes or other mechanism  
 may be kept permanently in action. And the apparatus attached  
 to the locomotive engine for the purpose of moving the regulator  
 is more or less independent of the latter, in order that the regu-  
 lator "may not be impeded or strained, and that it may be  
 " moved at the required time whatever its position."

[Printed, 4d. No Drawings.]

A.D. 1860, December 20.—N° 3125. (\* \*)

FOURNIER, AMÉDÉE BENOIT.—(*Provisional protection not  
 allowed.*)—"Preventing accidents on railways."

"The invention consists of a lever combined for preventing the collision of locomotives coming or going to meet one another, in a straight line, in a curved line, or when many lines traverse the one and the other. This system consists in a little apparatus supporting the levers, as mentioned above, placed on the way at a distance of 1,100 yards one from the other, but communicating with each other in every 2,200 yards, and by that means forewarning any locomotive which is within the distance of 2,200 yards, either before or behind. Supposing some carriages become detached on the line, and a train coming before or behind is obliged to stop," the engine driver is warned of the approach of the train by the apparatus, "which shuts off the steam and which gives an alarm by whistling. By these precautions it would be impossible for any accident to happen. This system possesses also a great advantage in suppressing the use of signals."

[Printed, 4d. No Drawings.]

A.D. 1860, December 20.—N<sup>o</sup> 3134.

SOUTHAM, EDWARD.—(*Provisional protection only.*)—"Improvements in machinery and apparatus for retarding and stopping railway trains."

This invention "consists in making the breaks of railway wheels of such a shape that when drawn into contact with the wheels of the engine, tender, or carriages, they act also upon the rails of the permanent way. The lower part of the break is so shaped that when drawn against the wheel it acts as a wedge, or the said lower part of the break may be shaped in such a manner as to raise the wheel entirely off the rail, and thereby to throw the weight of the carriage on to that part of the break which acts on the rails of the permanent way. By this means the momentum and the gravity of the engine, tender, or carriages are brought to bear on the breaks for the purpose of rapidly retarding and stopping the train."

[Printed, 4d. No Drawings.]

A.D. 1860, December 21.—N<sup>o</sup> 3143.

GLOVER, JAMES.—(*Provisional protection only.*)—"Improvements in mounting and fixing opaque letters or numerals on a translucent ground."



This invention consists "in mounting and affixing letters or " numerals between transparent or plate glass and translucent " glass or porcelain which serves as a ground, so that the opaque " letters or numerals, contrasting with the colour of the same, are " made distinctly visible, whether illuminated in front or at the " back."

The glasses are placed in frames suitable for being fixed in any desired position, and the invention is mentioned as being applicable to railway carriages as well as to the doors of houses, hotels, and other buildings, ships' cabins, omnibuses, and cabs.

[Printed, 4d. No Drawings.]

A.D. 1860, December 22.—N° 3147.

HUGHES, HENRY.—(*Provisional protection only.*)—"An improved method of making wheels for carts, waggons, and " carriages for common roads and railways."

This invention consists, in the first place, in "the introduction " of wrought or cast iron tubes, whether taper or cylindrical," and whether "rectangular or of oval section, instead of the usual " wooden spokes," there being cast upon the inner ends of such tubular spokes a nave of suitable shape, which is effected in the following manner:—"The spokes are laid in a template made " in two parts, so that it is impossible to move them from " their position;" a mould is then made of the nave, in sand, and the template and spokes so disposed that the ends of the spokes are in the mould when the metal is run round them. After the nave has been cast on the spokes, felloes are attached in the usual manner, and a tyre shrunk upon the whole, "or a tyre may be " fastened on without the felloes."

The invention further consists in a mode of forming a wheel with spokes, composed of bars of wrought iron so bent that each bar constitutes two spokes as well as a portion of the rim, the spokes being in pairs, each pair touching or being in contact at the outer ends, but some distance apart at the nave, which is cast upon the inner ends of the spokes, and a felloe and tyre placed around the whole in the ordinary manner.

[Printed, 6d. Drawing.]

A.D. 1860, December 27.—N° 3171.

GUERREE, TOUSHAINT VICTOR.—(*Provisional protection only.*)—"An apparatus for moving waggons or carriages on railways."



" It consists of a frame placed on wheels running on the rails  
 " provided with a platform for an attendant to stand upon, and  
 " with a winch handle for giving motion to a worm or endless  
 " screw, in gear with a worm wheel upon the axle of the railway  
 " wheels. The top of the frame engages in a hook on the car-  
 " riage to be moved. The wheels may be roughed or jagged  
 " to give them a better hold on the rails, and the bite may be  
 " further secured by means of a rod carried from the top of the  
 " frame to an excentric on the axle of the wheels."

[Printed, 4d. No drawings.]

1861.

A.D. 1861, January 1.—N° 3.

HENRY, MICHAEL.—(*A communication from Philippe Louis Aimé Stilman, and Louis Anne Felix Allain.*)—"Improvements in  
 " breaks, applicable to carriages and rolling stock used on rail-  
 " ways and elsewhere."

" This invention consists of " a break, in which a wedge block or  
 " variously shaped moveable piece is brought between a wheel  
 " pulley or revolving object to be stopped or retarded, and an  
 " inclined plate, plane, or surface on a bar, rod, shaft, bearer,  
 " arm, or equivalent, and thereby effects the required retarding  
 " or stopping action. The break may be applied so as to act  
 " against the ordinary or bearing wheels of the carriage, or on a  
 " wheel keyed on the axle or on the revolving part or object  
 " desired," and such block or break piece " may be readily  
 " actuated or controlled by appliances suitable for bringing it  
 " into the required position between the inclined surface and the  
 " revolving wheel or object where it pushes in and bears, presses,  
 " or acts to the desired extent to effect the required stopping  
 " or retarding action."

Various modes of carrying the invention into effect may be  
 adopted, but an arrangement is described "by way of example,"  
 in which the break block or wedge acts upon a "hind bearing  
 " wheel," and "is jointed to a suitably centred lever, raised or  
 " lowered by a chain, rod, or equivalent, and weighted at one  
 " end. The block has a friction piece (saabot) jointed to it," and

a bar is mounted below the body of the carriage which has at the end next the block an inclined plate or surface, while to the other end is jointed a friction piece "to act on the front wheel." When the breaks are not required to act, the chain or rod attached to the weighted lever is placed in connection with a catch, so as to hold up the weighted end of such lever, but when it is desired to bring the breaks into operation, the chain is released from the catch, allowing the weighted end of the lever to descend and force down the break block between the inclined plate and the hind wheel, the bar above mentioned also being moved, so as to press its friction piece against the front wheel. Apparatus such as described above is applied at each side of a carriage, so that all the four wheels thereof may be acted upon simultaneously.

Another arrangement is described, in which the apparatus is made to act upon break wheels placed on the axles of the carriage, instead of upon the bearing wheels of such carriage.

[Printed, 8d. Drawing.]

A.D. 1861, January 10.—N° 62.

MOULTON, STEPHEN.—"Improvements in the manufacture of india-rubber applicable to spring valves for machinery, and other purposes."

This invention relates to the manufacture of india-rubber "applicable to springs for railway engines, carriages, buffer springs, and other purposes where elasticity is required, and likewise to valves of various sorts." The improvements "consist in the embedding of spiral or other suitably-shaped springs of steel or other suitable metal into the mass of the india-rubber during its formation into the required shape, and before its being 'cured,' and after its being so compounded by being moulded with the springs while in a soft state it is subjected to the process of 'curing,' as is well understood by india-rubber manufacturers. For making india-rubber valves, strips or plates of steel or other suitable metal are embedded spirally, or radially, or longitudinally, or in other desired forms according to the shape it is intended to make the valve, and in one or more thicknesses in the mass of the india-rubber during the process of moulding to the desired shape, such strips or spirals or other shaped metal being placed in the centre of the thickness of the valve, or towards one side or the other according

" to the degree of elasticity required to be given," the whole being then subjected to the process of "curing" already alluded to.

The details of the invention may be varied, but the patentee states that the processes described in the Specification of a patent granted to W. E. Newton, January 30th, A.D. 1844, No. 10,027, and in the Specification of a patent granted to himself, February 8th, A.D. 1847, No. 11,567, are very suitable for carrying out this invention.

[Printed, 8d. Drawing.]

A.D. 1861, January 10.—N<sup>o</sup> 68.

**LONGMAID, WILLIAM.**—"Improvements in hardening the " surfaces of the rails of railways, and the surfaces of the tyres " of railway wheels, and in charring the surfaces of timber, to be " used for railway sleepers and other purposes."

According to one part of this invention the tyres of railway wheels, " after they have been formed in the usual manner, are " subjected to heat in combination with peat or other vegetable " carbonaceous matter, previously saturated with dilute sulphuric " acid, or not, by which means their surfaces are hardened and " vegetable charcoal manufactured." The tyres are packed in a suitable vessel while undergoing the hardening operation, and they are afterwards tempered by any well known process. The time required for the hardening operation will depend upon circumstances, but the patentee states that he has found " that " thirty-six to forty-eight hours have produced very good " results."

The invention is applicable not only to the tyres of railway wheels but also to the surfaces of rails, and likewise to charring the surfaces of timber for railway sleepers and other purposes, in the latter case the timber being saturated with dilute sulphuric acid and then dried in a suitable chamber or oven; the saturation of the timber being facilitated if necessary by placing it in a chamber into which steam is introduced and then condensed, the dilute acid being then injected into such chamber.

[Printed, 4d. No Drawings.]

A.D. 1861, January 11.—N<sup>o</sup> 74.

**MUNTZ, WILLIAM HENRY.**—"Improvements in breaks for " locomotive engines."

The principal object of this invention "is to make use of steam from the boiler to apply the breaks to the wheels of a locomotive engine, or to the rails, or both, as may be preferred."

The invention "consists principally in connecting a steam chest to each side of the boiler by means of a pipe furnished with a valve or stop-cock. The lower side of this steam chest is furnished (immediately over each wheel) with a piston, to the piston rod of which (passing out through a stuffing box) the break block is attached. When the steam is admitted to the steam chests the pistons are all simultaneously depressed, and the break blocks are thus applied to the wheels. The steam chests are also furnished with an escape valve or cock, through which the steam may be allowed to escape, and the break blocks will then be again raised either by vacuum, springs, or counter-balance weights."

"By placing additional pistons over the spaces between the wheels, with elongated rods and break blocks, breaks may be thereby applied to the rails also, so that as many as ten breaks may be simultaneously applied, if desirable, viz., six to the wheels and four to the rails; or instead of applying the intermediate breaks to the rails they may be made of a double or wedge-shaped form and applied between the peripheries of the wheels."

[Printed, 10d. Drawing.]

A.D. 1861, January 11.—N° 86.

SMELLIE, ROBERT.—"Improvements in apparatus for supporting and working sash windows, and other similar sliding or traversing details."

This invention relates to the adaptation of a spring movement and lock or detent catch to the sliding or traversing and stop actions of sash windows, and other sliding or traversing details of a generally similar character.

According to one modification of the invention the apparatus consists of "a horizontal bracket or holding frame screwed or attached to the case or guide portion of the framing in which the sash traverses. This bracket carries a spring box, working upon a horizontal centre. This box carries within it a coiled or convolute spring of flat steel, or the spring may be made of wire or other material. On the exterior of the spring box is coiled a strap, cord, or other connecting detail, and the upper

“ and is attached to the spring case, which acts as a pulley, whilst  
 “ the lower end is fastened to the bottom of the sash. The con-  
 “ sequence of this arrangement is that when the sash is pulled  
 “ down the tensional action of the strap or cord operates so as to  
 “ turn round the box and wind up the spring. When the sash  
 “ is pushed up the reverse action takes place. In this way the  
 “ sash is supported by the spring. To stop the sash at any par-  
 “ ticular part a spring detent is fitted upon the spring box to  
 “ work a stop pin which gears with holes in the edge of the sash.  
 “ Instead of this the spring may operate through a fusee, so as  
 “ to equalize the spring action, and enable the window to remain  
 “ at any desired level. Both the upper and lower sashes may be  
 “ worked by this spring movement, one spring being fitted to  
 “ each, whilst to ease the action the opposite side of the sash has  
 “ a spring pulley between its edge and the case.”

This modification is more especially applicable to the windows of dwelling houses and other buildings, but a modification is described which is applicable to the raising and fixing of carriage windows, in this case the spring pulley being arranged in the carriage door, and the band or other detail carried down to the sash; the spring catch for fixing the window being placed near the lower part of the opening in the door, so as to retain it at any desired height. The patentee states that such an arrangement in railway carriages “ would possess many advantages over the modes at present in use.”

[Printed, 8d. Drawing.]

A.D. 1861, January 15.—N° 118.

NEWTON, ALFRED VINCENT.—(*A communication from Samuel J. Seely.*)—“Improvements in the construction of railway and other carriages.”

This invention consists “in constructing the bodies of railway carriages and other vehicles of corrugated metal plates, properly braced and secured together in such a manner as to secure a greater degree of strength to bear weight and resist pressure than has heretofore been attained with the same weight of metal.”

The corrugations “may be larger or smaller according to the size of the carriage, the principal thing to be observed in their formation being that their bends should not be so acute as to

"impair the natural strength of the metal." Strong pieces of angle iron may be used to form the base and corners of the carriage, the corrugated plates being rivetted to them, and the door casings may be formed of continuous pieces of metal, bent as requisite. At the bottom of the carriage are "trough beams," and to these the journal box pedestals are rivetted.

For large railway carriages two or three layers of corrugated plates are connected together by rivetting, the plates being so arranged that the corrugations of one may cross those of that placed against it, a structure of great strength being thus obtained. In order to obtain a smooth interior surface to a carriage plain plates of metal may be rivetted to the corrugated plates; or such plates may be furnished with designs to render them ornamental, and spaces between these and the corrugated plates, or between the corrugated plates themselves, may be rendered available for both ventilating the carriage in hot or supplying it with heated air in cold weather.

For railway carriages intended for pleasure or for use in tropical climates "side wings" may be applied, these being jointed to the sides or cornice of the roof, and so arranged as to be placed at any desired angle in order to shield the passengers from the rays of the sun, and turned over upon the roof when not required for that purpose.

[Printed, 10*d*. Drawings.]

A.D. 1861, January 15.—N<sup>o</sup> 119.

BIGELOW, LUCIUS AURELIUS.—(*A communication from Joseph Harris, junior.*)—(*Provisional protection only.*)—"Improvements in the construction of certain kinds of passenger carriages."

This invention relates to "an improved mode of constructing that description of carriages which are used to convey passengers upon street tramways or horse railways," but it may, with some slight modifications, be adapted to omnibuses intended to run on common roads. One of the principal objects of the invention "is to so construct the carriage that it may be made to accommodate a larger number of passengers within a given space than heretofore."

In carrying out the invention doors are placed at both ends of the vehicle, "but instead of these doors being in the middle or equidistant from the sides, as they usually are, they are placed



" at the near side corners of the vehicle. The traction appendages of the vehicle are so arranged that they may be adapted to either end, and therefore the door at the hinder end of the vehicle will always be so situated that it may be brought up close to the side walk for the convenience of passengers getting in or out. The opening and closing of the doors is placed under the control of the driver by means of a spring catch, or bolt, or other contrivance that may be worked by a strap or cord by the driver," passengers being thus prevented from entering or leaving the carriage without his knowledge.

[Printed, 4d. No Drawings.]

A.D. 1861, January 19.—N° 150.

BOND, JOSEPH.—(*Provisional protection only.*)—"Improvements in railway wheels."

This invention consists in an improved mode of constructing wheels by so forming the parts that "they may be put together when cold," the "risk attendant on shrinking" being thus avoided, and the use of bolts, screws, or rivets for securing the tyre being rendered unnecessary, the "full strength" of the tyre being thus retained. In order to effect these results the inventor uses "a tyre of a peculiar form, the inner periphery being inclined or bevelled from both edges towards the centre, the heads of the spokes, the spoke rim, or the disc of the wheel, as the case may be," being made "with an incline or bevel on the outer periphery to suit the bevel of the tyre," and a loose ring or disc of a corresponding bevelled form being provided, "which is to be fitted into a suitable recess, or recesses, in the spoke rim or disc last mentioned. These are then to be brought tightly together by screws or other mechanical means, and the bevelled surfaces being pressed inwardly in a wedge-like manner against the tyre will firmly bind the whole together.

[Printed 4d. No Drawings.]

A.D. 1861, January 19.—N° 153.

RICKARDS, JAMES BATESON.—(*A communication from Charles Jean de Mat.*)—(*Provisional protection only.*)—"Improvements in the construction of axle-boxes for the wheels of vehicles used on railways, applicable also to the wheels of vehicles used on common roads, for the purpose of reducing friction."

This invention consists "in adapting to the nave of a wheel a casing or box, passed through a hole in said nave, and also in adapting to the journal of the axle spheres of metal held in position between two grooved rings of metal, fixed at some distance asunder within the aforesaid box, and two corresponding grooved channels made in two collars formed upon the journal of the axle. The aforesaid spheres, which may be of small diameter, are held equidistant from each other around the axle, and within the box, by adapting other smaller spheres of metal between each of the larger spheres; by these means it is the larger spheres only that are in contact with the journal, and thus the friction in said journal is considerably diminished."

An "important feature" of the invention is mentioned as consisting "in its requiring little if any lubricating material to be used."

[Printed, 4d. No Drawings.]

A.D. 1861, January 21.—N° 160.

PICKSTONE, WILLIAM. — (*Provisional protection only.*) — "Improvements in trucks or waggons used for carrying coals."

According to this invention "a rectangular frame is made of T-iron or angle-iron to receive and have the bottom planking" of the truck or waggon "fixed thereto by bolts and nuts, together with other pieces of angle-iron. At the four angles of such quadrangular frame four uprights of angle-iron are fixed, to which uprights the side and end plankings are secured by bolts and nuts. At the top of the truck or waggon a rectangular frame of angle-iron is used, which is fixed to the four uprights; and when necessary there are other flat uprights to give additional support to the side planking. In fixing the planks at the bottom they are simply held between the bottom frame of T-iron or angle-iron and short pieces of angle-iron, which are fixed by bolts and nuts to the rectangular frame," which supports the bottom planking, "so that in the event of one or more of the bottom or other planks becoming defective and requiring to be removed and replaced, such defective planks may be moved without disturbing the others."

[Printed, 4d. No Drawings.]

A.D. 1861, January 22.—N<sup>o</sup> 177.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from the Société des Forges.*)—(*Provisional protection only.*)—"An improved method of manufacturing tyres for wheels, hoops, and rings."

This invention consists "in forming a faggot built up of bars of iron in layers, the bars in every successive layer crossing those in the preceding layer," and in treating faggots thus prepared so as to form tyres, hoops, and rings, "without a weld or joint round the circumference thereof."

The faggots are by preference so built as to be of an octagonal shape in plan, for which purpose bars of different lengths must be used. The faggot is brought to a welding heat, and welded into a solid mass under a steam hammer by the aid of dies and tools, which then "round the block, and punch a hole through the centre," the punching tool, however, driving the greater part of the metal "into the thickness of the blocks," and removing only a small portion. The block is then placed, in a heated state, upon the smaller part of a shaft "having two different diameters," and is there subjected to the blows of a steam hammer furnished with a die so formed as to give the proper shape to the outer surface of the tyre or ring. The latter "becomes expanded," and when sufficiently so "the shaft carrying it is driven forward, and the ring is shifted on to its larger diameter." The blows of the hammer are repeated until the ring or tyre has been beaten out to the requisite extent, "when it is removed from the shaft, and may be finished by rolls or otherwise in the ordinary manner."

[Printed, 4d. No Drawings.]

A.D. 1861, January 25.—N<sup>o</sup> 202.

**NEEDHAM, SAMUEL.**—"Improved spring apparatus, applicable to bedsteads and other articles to which springs may be applied."

This improved spring apparatus is mentioned as being adapted "especially for the seats of railway or other carriages, producing at the same time a firm and elastic seat." The invention consists in a mode of employing flat springs, instead of making a box filled with spiral or helical springs serve as the foundation for the seat, as ordinarily practised, the "spring power" in this case being "on the framing of the seat, and forming part thereof." Thus a

number of flat springs are bent into an arched form and placed parallel with each other, the ends of the springs being connected to pieces of metal having slots therein, through which screws are passed, these screws entering into the framing, and keeping the springs in their different relative situations, but allowing the slotted pieces to slide to a certain extent to and fro, according to the pressure which may be brought to bear upon the springs, the seat itself resting upon the highest parts of the curved portions of the latter, and being secured thereto.

These arrangements may be variously modified, and be adapted to bedsteads, easy chairs, camp stools, sofas, and other articles, as well as to the seats of railway and other carriages. The springs may be of metal, or, where great economy is desired, of wood; in the latter case the ends being merely curved, and placed in grooves in the framing, the patentee stating, however, that he prefers to use the slotted pieces mentioned above.

[Printed, 10d. Drawings.]

A.D. 1861, January 28.—N<sup>o</sup> 226.

NEWTON, WILLIAM EDWARD. — (*A communication from Ebenezer A. Lester.*) — “Improvements in railway carriage wheels.”

The patentee remarks, in the first place, that repeated efforts have been made to introduce an elastic material, such as india-rubber, between the rims and bodies of railway wheels, for the purpose of relieving the axle and its bearings from the violent jar and concussion caused by such wheels passing over obstructions and irregularities upon or in the rails upon which they may be travelling, but that it has been found in practice that india-rubber, “when subjected to such constant concussion and wear, will not last unless it is severely compressed when applied.”

He then states that the present invention “has for its object to confine and compress an elastic bearing of vulcanized india-rubber between the removable rim and body of the wheel, and consists in forming the bearing face or periphery of the wheel, and also the corresponding inner surface of the rim, inclined, so that as the rim is drawn up laterally to the wheel by the screw bolts (or other means) which fasten the two parts of the wheel together, the rubber which is placed between these two inclined surfaces will be severely compressed, as required.”

[Printed, 8d. Drawing.]

A.D. 1861, January 30.—N° 253.

**JOHNSON, JOHN HENRY.**—(*A communication from Edward Burke and Thomas A. Andrews.*)—"Improvements in the construction and internal arrangement of railway carriages."

According to the first part of this invention it is proposed to provide the interior of a carriage with "sliding and hinged seats, so arranged as to open out and form convenient couches," thus converting it into a sleeping carriage. "It is also proposed to employ platforms provided with cushions suspended from the roof of the carriage, at the sides thereof, by means of jointed rods, which rods admit of the platforms being drawn down when required as sleeping berths, or of being pushed up out of the way of the rest of the passengers when out of use. A board hinged to the roof conceals each set or pair of berths when pushed up, and serves also to support them when elevated. The carriage, which is made in one large compartment for the passengers, is provided with a retiring compartment or closet fitted with a lavatory and watercloset. Suitable curtains are used for enclosing the different sets of berths, and seats affording accommodation for four persons. Ventilators are also provided in the roof and sides of the carriage, and in summer these ventilators, as well as the windows, may be covered by wire gauze dust and spark arresters."

According to the second part of the invention, "which relates to the ordinary railway carriages, it is proposed to hinge the ordinary padded arms, dividing the seats, to the back, so that they may be folded back and leave the entire length of the seat unobstructed, which will then form a couch. Immediately above each of such couches are suspended, as before described, two other berths, which may be drawn down or pushed up out of the way according as they are required or not. Each compartment of an ordinary first-class carriage will thus afford sleeping accommodation for the whole of its (six) passengers."

The details of the invention are described at considerable length, and illustrated by an elaborate Drawing.

[Printed, 1s. Drawing.]

A.D. 1861, February 4.—N° 288.

**WALMSLEY, DAVID, and ROSTRON, JOHN.**—"Improvements in apparatus for providing against accidents in hoisting



“ machinery, part of which improvements are applicable to railway carriage coupling links.”

One part of this invention relates to the construction of a coupling link which is to be placed between the box or cage of a hoist and the suspending rope or chain, the object of this link being to prevent the consequence of over-winding; the coupling link being arranged so that the suspending rope or chain will become disconnected from the box or cage when the latter rises above a certain desired elevation. This coupling link is constructed in the form of a box disc, having pivots in its centre or axis upon which a link or hook is jointed. In the edge of the box disc is a T-shaped slot, one end only of which will admit of the passage of the T-formed head of another link or hook, “ and thus when it is placed in the said T-shaped slot the said box disc will have to be turned on its axis before the said T-headed link or hook can be detached from the said T-shaped groove. The said box disc is weighted, or acted upon by a spring or springs, so as not to turn by accident, and it has a projecting arm which comes against a stop when the box or cage ascends too high, which will cause the said box disc to turn and allow the T-formed headed link or hook to become detached from it. One of the said links is connected with the suspending rope or chain, the other with the box or cage.”

It is this part of the invention which is applicable as a coupling link for railway carriages, “ by the use of which, and by means of a rope or chain, or other arrangements ” connected with such a box disc or discs, the carriages of a train may be readily disconnected, “ either when standing or in motion, without danger to the person employed.” An arrangement is described in which the end of each draw bar is forked to receive a box disc, the connection between the two being formed by a link, connected to a weighted lever and carrying screws at each end, which are furnished with projections which enter the T-formed slots in the boxes, the result being that the projections cannot leave the slots until the discs are turned into a certain position, which is effected, when it is desired to disconnect the carriages, by the use of shafts passing across the carriages and furnished with handles, and operating upon the box discs through the medium of certain segment pulleys, chains, and other apparatus, all of which are minutely described.

[Printed, 1s. Drawings.]

R. C.



A.D. 1861, February 4.—N° 292.

MORGAN, EDWARD CHARLES.—(*Provisional protection only.*)—"Improvements in carriage building."

The object of this invention is "to prevent noise and sound in the bodies of railway and other carriages," and the invention consists in constructing such bodies, "or parts of bodies," of two or more layers or thicknesses of wood, which are joined or cemented together, each layer or thickness being perforated with holes, which, however, it is preferred, "shall not come opposite each other." and there being interposed between such layers a layer of leather, or felt, or other soft substance, "suitable for damping or preventing sound."

The inventor mentions that in some cases leather, felt, or other soft substance "may be also applied on the exterior and interior of such combinations of wood and other materials," and that by these means the bodies or parts of the bodies of railway and other carriages "will be rendered less liable to the noise and sounds now so commonly found to occur in the bodies of carriages."

[Printed, 4d. No Drawings.]

A.D. 1861, February 4.—N° 294.

MURRAY, JOHN.—(*Provisional protection only.*)—"Improvements in railway carriages."

This invention relates "to a peculiar construction and arrangement of railway carriages, whereby the injurious consequences arising from a collision or sudden derangement of the train are to a great extent neutralized." It is proposed "to cover the entire, or the greater portion of the roof, bottom, and ends of railway carriages with a thick padding of soft or elastic material, so as to form a complete external cushion at those parts." The padding at the ends of the carriages may serve in place of the ordinary buffers, and, if found desirable, portions of the padding at one end of a carriage may be made to "interlock or fit loosely into corresponding recessed or sunk portions in the end of the next carriage, so that should an axle or wheel become broken or detached the damaged carriage will be still supported by the interlocking of its extremity with the next carriage, and thereby prevented from falling."

"It is further proposed so to arrange the seats in each compartment that the passengers will sit in one direction in place of

"face to face;" and to construct the shell or framing of each carriage with curved in place of flat ends, enveloping each carriage with an outer padding, as above described, "such padding being, however, flat or corrugated at the ends, so that an additional amount of padding will be placed at each corner, thereby greatly protecting those parts most liable to fracture."

[Printed, 4d. No Drawings.]

A.D. 1861, February 11.—N° 343.

CLARKE, WILLIAM SAINT THOMAS.—(*Provisional protection only.*)—"A railway break."

This invention consists in "intersecting the axle or axles of the driving wheels of locomotives transversely with a current of electricity, and in intersecting the axle or axles of the locomotive and the axles of the tender and carriages, and the axle or axles of the tender and luggage vans, waggons, or trucks, transversely with a single or with separate currents of electricity whereby most efficient 'grip' or 'bite' on the rails will be obtained."

[Printed, 4d. No Drawings.]

A.D. 1861, February 11.—N° 345.

JOHNSON, JOHN HENRY.—(*A communication from Jose Gallegos.*)—"Improvements in the construction and arrangement of bearings and grease boxes for shafts and axles, applicable also to the bosses of wheels."

This invention is applicable, among other purposes, to the axles of "the rolling stock of railways" and other vehicles in which the axles rotate, and the invention consists in the employment of a number of antifriction rollers, "which are fitted loosely on to separate and independent axles of their own, and so disposed inside the grease box as to leave a space in the centre of them," into which space the journal of the axle is introduced, "resting upon the peripheries of the lower antifriction rollers of the circular series."

The grease box is kept full of lubricating matter, and arrangements made by which such matter is allowed to circulate freely around and among the rollers. The latter are by preference made of steel, or the ends may be of steel and the central portions of

cast iron, such central portions being of somewhat less diameter than the ends, and the latter thus constituting the "working parts" of the rollers, the central and end portions of each roller being united by a bolt. Rollers formed wholly of steel may also be of reduced diameter at the central parts, and wheels which revolve loosely on their axles may have such rollers placed inside their naves or bosses, the rollers in such cases revolving round the axle journal as well as upon their own axes. Small glass covered apertures are formed in the grease box, and the invention may be applied to "rotating shafts and axles of all kinds."

[Printed, 8d. Drawing.]

A.D. 1861, February 13.—N<sup>o</sup> 362.

ELLISSEN, ADOLF.—(*Provisional protection only.*)—"Improved apparatus for working the breaks of railway trains."

This invention consists "in working these breaks by pneumatic pressure, made to act on the pistons of cylinders conveniently placed beneath the carriages, so that they may act direct upon the breaks or the break levers. To this end air tubes or pipes are placed or arranged along the centre part of the under side of all the carriages, so that the pipes of several carriages may be joined together in one continuous length." These pipes communicate by means of branch pipes with the air cylinders, and an air pump is placed upon the engine, or tender, or in some convenient part of the train, and worked either by the locomotive engine, or by a small supplementary engine arranged for the purpose. "Upon putting the air pump in communication with the main air pipes beneath the carriages, air will be exhausted from the pipes, and also from the air cylinders in front of the pistons, and the external atmosphere will then act with great pressure on the other side of the pistons, and by forcing them forward will cause the breaks to bind on the wheels and retard the progress of the train." The air pipe of one carriage is connected to that of another by a flexible tube, or by "iron tubing with flexible joints," and in order "to take the pressure off the breaks, a stop cock is adapted to the continuous air tube immediately behind the air pump, so that air from the external atmosphere may be admitted into the air tubes and cylinders," and the breaks are then removed from the wheels by springs.

[Printed, 4d. No Drawings.]

A.D. 1861, February 14.—N<sup>o</sup> 377. (\* \*)

DEVLAN, PATRICK SANSFIELD.—“A new and useful bearing surface for all kinds of journal and axle boxes.”

The invention consists in the use and application of the pulp employed for making paper for boxes and bearings of journals as a substitute for the various metals, alloys, and compositions used for such purposes. It may be used alone or mixed in combination with plumbago-plumbaginous substance, plaster, or other suitable material, by means of gum shellac or other gum, and moulded when wet into form by pressing it into the stands or iron boxes, or other convenient way, as in casting Babbit metal boxes, and allowed to dry.

[Printed, 4d. No Drawings.]

A.D. 1861, February 15.—N<sup>o</sup> 385.

MANSBRIDGE, WILLIAM HENRY.—(*Provisional protection only.*)—“Improvements in railway brakes.”

According to this invention “apparatus is applied to each railway carriage, in order that brakes may be put on two or more of the wheels when the locomotive or forward carriages of a train are retarded.” Each brake is suspended by a suitable link or rod, so as ordinarily to hang clear of its wheel, and is, by means of a connecting rod, which is pin-jointed to it, attached to an arm on a brake axle, the connecting rod being pin-jointed to the arm on such brake axle,” and “on each end of the brake axle is a slotted arm or lever, by acting on which the brake axle is turned partly round, which causes the brake to be pressed on the wheel on each side of the carriage, and such slotted lever or arm is acted on in the following manner:—

“Each carriage carries a rod or cord, which is capable of sliding in suitable bearings or supports, and when a train is made up these rods are all attached together by suitable chains or other couplings. This rod or cord is connected in each case to a weighted pendulous apparatus, in such manner that such apparatus may, when it is desired that the brakes of the train should come into action, be moved out of its perpendicular position by the engine-driver or other person in charge of the train,” and so cause “a catch or hook at the end of a rod to come into position, to be acted on by a stud or projection carried by and fixed to the end of the buffer rod, the hook or



“ catch at other times being kept out of the way of such stud or  
 “ projection, thus leaving the buffers and their rods free to move  
 “ without acting on the brake apparatus.” The object in using  
 a slotted lever or arm is “ that the brake may be put on imme-  
 “ diately the buffer rod has moved back a few inches, and that  
 “ as the buffer rod is moved further and further back, the pin or  
 “ stud on the bar, which is forced back by the buffer rod, may  
 “ move in the slot and act on the slotted lever or arm at a greater  
 “ and a greater distance from the brake axle,” but any other  
 form of lever or arm may be used, so long as the arrangement is  
 such “ that the brakes may be put on before the buffer rods have  
 “ been forced back to the fullest extent they are capable of being  
 “ moved, and that the further movement back of the buffer rods  
 “ shall be expended by the bars put in motion, thereby sliding or  
 “ moving along the levers or arms on the brake axle.”

[Printed, 4d. No Drawings.]

A.D. 1861, February 21.—N° 431.

LONGSHAW, JOHN. — (*Provisional protection only.*) — “ An  
 “ improved method of applying breaks to the wheels of railway  
 “ and other carriages.”

This invention consists “ in applying breaks to wheels at a  
 “ point directly vertical above the axle, or nearly so, in contra-  
 “ distinction to any other portion or part of the wheel, by which  
 “ improvement a greater holding or ‘ break ’ power may be  
 “ exerted upon the wheel than hitherto, and by any ordinary  
 “ appliances of leverage or screw power, without injury to the  
 “ axles, bearings, and other parts of the carriage. The pressure  
 “ and strain exerted by the break in the improved position being  
 “ directly vertical from the break, and its applied power to the  
 “ ground or rail, instead of being exerted in a horizontal direc-  
 “ tion,” prevents the “ break power ” from being “ injuriously  
 “ exerted upon the axle at its bearings.”

[Printed, 4d. No Drawings.]

A.D. 1861, February 21.—N° 433.

NEWTON, WILLIAM EDWARD. — (*A communication from Augustin Castellni.*) — “ Improvements in breaks, applicable to railway  
 “ carriages.”

According to this invention there is fixed upon one of the axles  
 of one of the carriages of a railway train, by preference the last

carriage, or break van, a bevil wheel or friction cone, which on the rotation of the axle communicates motion through the medium of a second corresponding wheel or cone to a vertical shaft. On this shaft are placed loosely two bevil wheels, facing each other, there being between them and in gear with both a third bevil, and there being also on the shaft between the two bevils thereon, clutch apparatus, which may be so moved as to cause either one or the other of those wheels to rotate with the shaft, and so cause the third bevil to rotate in either direction at pleasure. This wheel is fixed upon a horizontal shaft, on which is also a pinion, this, again, being in gear with a large wheel fixed upon another shaft, which extends longitudinally below the body of the carriage, and is provided with screws, which enter into screwed pieces or nuts connected to levers, by means of which, in conjunction with certain rods and other appendages the breaks of the carriage are operated, the rotation of the longitudinal shaft in one direction pressing them against the wheels, and the reverse movement of the shaft withdrawing them therefrom. The whole apparatus is brought into action, or placed out of action, by placing the wheels or friction cones first mentioned into or out of gear or contact, and in order to facilitate the withdrawal of the breaks from the wheels after their action upon the wheels is "complete," certain gearing is provided which may be turned by a hand wheel. The longitudinal shaft of one carriage is connected with that of another by sliding and universal joints, so that the breaks of all the carriages of a train may be brought into action simultaneously by the apparatus mentioned above, but the breaks of any single or separate carriage may be worked by means of gearing which connects the longitudinal shaft of such carriage with a vertical shaft provided with a winch or hand wheel. An indicator is employed to show the exact distance between the breaks and the carriage wheels, and the longitudinal shaft is mounted in bearings which rest upon the bearings of the carriage axles, this framing, moreover, "making the carriages more solid."

[Printed, 10*l*. Drawing.]

A.D. 1861, February 21.—N<sup>o</sup> 435.

EVANS, DANIEL.—"Improvements in the manufacture of rail-way and other wheels."

According to this invention "the flanged tyre is rolled or formed with an interior rib or projection, the sides of which are



“made to incline to the inner surface of the tyre, so as to form a dovetail section, or other section of such like form as will prevent the projecting rib passing outwards from between two surfaces, one on either side, which combine the tyre with the nave. These two sides consist of two circular plates or discs formed with flanges at their outer edges, which project inwards, the edges of such flanges being formed to correspond with the sides of the inner rib or projection on the tyre, so that when the two side plates are fixed in their places no part of the tyre, though broken into many pieces, will be able to get away or be thrown off from the side plates.” The patentee states that he prefers the nave “to consist of an inner cylinder of somewhat larger diameter than the central holes or openings through the side discs or plates, and such cylinder is extended at each end, but of less diameter, so as to pass through and fit the central openings in the two side plates or discs, and provision is made for fixing plates or washers on the ends of the cylindrical nave outside of the side plates or discs.” The latter are by preference parallel to each other and vertical, and may be connected to each other and to the tyre by bolts or rivets.

Different modifications of the invention are described, in some cases the discs being connected to each other by means of a ring, and rings being in other cases used both to connect the discs to each other and to the tyre.

[Printed, 16d. Drawing.]

A.D. 1861, February 22.—N<sup>o</sup> 442.

MANNIX, JAMES BALL.—(*Provisional protection only.*)—“An improved method of applying springs to railway and other carriages.”

Instead of applying springs to carriages “as at present, whereby any elevation of the axles caused by the inequalities of or obstacles to the ground over which they roll is directly transmitted to the bodies of the same,” the inventor proposes “to so apply springs as to obviate that defect by employing bars or levers so placed and in such manner as that certain ends of the same, to which the bodies will be connected, shall remain nearly motionless in a vertical direction by reason of the unequal amounts of vertical displacement of the axles and of those parts of the springs to which these bars or levers will be attached.” One end of each of these bars or levers the inventor proposes to

" suitably attach to the axles, or to rigid pieces connected with the axles," and to connect the other end " with the bodies, or with the under carriages, or with the cross springs or other side springs, should such be used additionally, and to cause certain parts of these bars or levers intermediate between the ends to rest in a suitable manner on certain parts of the side springs, for example, on the ends of the side springs, when of the form of ordinary railway carriage springs."

The inventor mentions that " the principle of these bars or levers is applicable to every form of spring now in use for carriages drawn by horses, as well as for the form of spring used for railway carriages."

[Printed, 4d. No Drawings.]

A.D. 1861, February 25.—N° 477.

HENSON, WILLIAM FREDERICK. — " Improvements in springs."

The patentee mentions in the first place that springs constructed of a number of flat plates of steel lying one upon another, and connected by means of studs on one plate passing into slots in the next, are apt to break, and pieces of the plates falling out, the next plates lose their support and break likewise, the spring being thus speedily destroyed. And he then states, that in the present invention he employs " plates of steel of a groove-shaped section, fitting one into the other, instead of flat plates, thus greatly increasing the strength of the spring with the same amount of metal, and also preventing the possibility of pieces falling out, should one of the plates break."

Springs may thus be formed of various shapes, and such springs may be applied " either for bearings springs for railway and other carriages, for locomotives and tenders, and for any other purpose to which such springs are applicable."

[Printed, 6d. Drawing.]

A.D. 1861, March 4.—N° 550.

WILSON, GEORGE.—(*Provisional protection only.*)—" An improved construction of railway buffer."

The object of this invention " is to construct buffers which shall be better able to sustain the exceptional as well as the ordinary shocks to which they are exposed than those in

"common use," and it consists in the first place in forming the buffer boxes of wrought iron, instead of the cast metal ordinarily employed, there being fitted to the outer end of the box a gland of wrought iron to receive the plunger, this gland being secured in position by "lateral screws." The inner end of the box is provided with a flange to receive a "wrought-iron end plate," which is secured thereto by rivets," and the rod which couples the plunger to the box passes through the centre of this plate, and is secured in position by a nut applied to the tapped end of the coupling rod.

[Printed, 4d. No Drawings.]

A.D. 1861, March 7.—N° 580.

POUARD, NICOLAS AUGUSTE.—(*Provisional protection only*).—  
"Improvements in breaks for railway rolling stock."

According to this invention there is placed upon one of the axles of a locomotive engine a toothed wheel, this wheel being loose upon such axle, but having within it a thread or worm corresponding with a thread or worm upon the axle. On moving the wheel towards the thread on the axle, and so causing this thread to take hold of that in the wheel, the latter is caused to "screw up" and become fixed upon the axle, at the same time coming into gear with another toothed wheel of larger size, which being caused to rotate causes a pulley and ring connected therewith to rotate also, and so coil upon the pulley a chain which is attached to the ring, which extends from the engine below the tender and all the carriages of the train which may be connected therewith. To this long chain shorter chains are attached at intervals, these shorter chains being connected to weighted levers which on being allowed to move in one direction by the action of the apparatus, as mentioned above, bring into action upon the wheels of the train breaks of the usual character. In order to release the breaks, a windlass mounted upon the last carriage of the train is used to reverse the motion of the long chain, and so raise the weighted levers into their first position. The toothed wheel connected to the chain pulley has the teeth removed from one part of its circumference, this regulating the amount of chain wound upon the pulley, and permitting also the movement of the chain to be reversed by the windlass with facility.

[Printed, 6d. Drawing.]

A.D. 1861, March 11.—N<sup>o</sup> 600.

BAKER, GEORGE WILLIAMS.—(*Provisional protection only.*)—  
“Improved apparatus for arresting the progress of railway accidents.”

The object of this invention “is to prevent the recurrence of that class of accidents to railway trains which arise from the breaking of a wheel or axle,” which object the inventor proposes to attain by “coupling the carriages together by chains or other suitable pendent couplings, attached at their opposite ends to brackets on the ends of the several carriages. The chains or other couplings are so arranged as to allow of their being severally connected to the preceding or following carriages (as the case may be) near the lower corners thereof. By this arrangement, in case of the breakage or dislocation of any tyre, wheel, or axle, the carriage so damaged will, instead of falling over, be suspended upon the chain from the adjoining carriage, and thus be prevented from running off the line.”

The inventor further proposes to provide the couplings “with a means of adjustment for regulating their tension to suit material variations in the load of adjoining carriages, and for other obvious reasons.”

[Printed, 4*l.* No Drawings.]

A.D. 1861, March 12.—N<sup>o</sup> 608.

AERTS, AUGUSTE.—“Improvements in apparatus for lubricating the moving parts of machinery.”

This invention relates to certain improvements upon the inventions for which former patents were granted to the present patentee, A.D. 1858, March 19th, No. 563, and A.D. 1859, June 18th, No. 1475. The present improvements consist, firstly, “in connecting the axle boxes of railway carriages loosely to or with the bearing or weight springs thereof, instead of rigidly as heretofore practised.” This is effected by making two or more grooves in the top of each axle box, in the direction of the length of the axle. These grooves are intended to receive projecting ledges formed on plates which support the springs of the carriage, the edges of these plates being formed with flanges which embrace the axle boxes, and are thereby kept steady, the result being that the body of the carriage can only move or slide along the axle boxes longitudinally, and the wearing of the brasses against



the shoulders of the axle journals which takes place under the ordinary system being thus prevented.

Another improvement consists in forming a conical recess in that side of each of the naves of the running wheels of the carriages which is next the axle box, in order to receive the leather collar described in the Specification of the patent of 1859, mentioned above, "the intention being to exclude dust more effectually from the journals of the axles on which the running wheels are fixed."

Another improvement consists in adapting a thin steel spring around the before-mentioned leather collar, to ensure the close contact of such collar around the axle.

Another improvement consists in adapting a spring catch to the lid of the axle box, or that part at which the lubricant is introduced, by which means the lid is kept closed, and the entrance of dust and grit prevented.

Another improvement consists in adapting a partition to the pierced gutter or spout mentioned in the Specification of the aforesaid patent of 1859, for the purpose of compelling the water propelled by the revolving disc to pass over the axle without being thrown also in another direction, as was the case in the invention described in that Specification; this part of the invention also including certain minor arrangements by which the construction of the valves employed to discharge the dirty water from the axle boxes is simplified, and the axle boxes otherwise rendered less costly.

The improvements are applicable to the bearings of shafts, and of machinery in general.

[Printed, 8d. Drawing.]

A.D. 1861, March 13.—N° 613.

SPENCER, GEORGE. — (*Provisional protection only.*) — "Improvements in india-rubber springs for railway and other uses."

One improvement in india-rubber springs consists in the method of supporting the india-rubber used in such springs. Supporting plates are inserted at intervals through the mass of the spring, as in De Bergue's or Paton's patented spring, but these plates are not allowed to project beyond the outside of the india-rubber, being kept inside, by which means the india-rubber

preserves a more regular outline, and is less strained than when the plates project beyond the india-rubber. The plates may be placed at either regular or irregular intervals asunder, and they may be formed of thin iron or other metal, or of wire gauze, or of any other material that will stand the strain of the india-rubber; or a metal wire may be coiled round into a spiral shape, so as to form a flat support, and be placed at intervals; or rings of metal may be placed singly or concentrically at intervals for the same purpose. When length of stroke is wanted the ordinary supporting plates may be used at intervals in conjunction with a system of inside supports, these consisting of rings or plates which may be imbedded in the substance of the india-rubber forming the spring in the course of manufacture, "or they may be used by cutting the india-rubber into layers or laminae, and inserting the supports between each layer." And such layers or laminae may be varied in density and thickness, so as to give the means of varying the shape of the spring, which may be of any required form. The india-rubber may have any substance mixed mixed with it which will improve its quality as a spring, and springs thus formed may be used as buffer, draw, bearing, or check springs for railway engines, carriages, and trucks, as well as springs for common road vehicles, and for other purposes. They may also be used as blocks for steel bearing springs to rest upon, or be placed on the ends of steel springs. "The supporting plates may also be used in combination with J. E. Coleman's patent rings for confining the india-rubber."

[Printed, 4d. No Drawings.]

A.D. 1861, March 14.—N° 632.

ROESSLER, FREDERICK.—(*Provisional protection only.*)—"Improvements in apparatus or means for preventing locomotive engines & carriages leaving the rails."

This invention consists "in the application of an extra line or extra lines of rails placed parallel with the ordinary rails, of a suitable form, so that guard clips secured to the carriages will pass along such rails, without, however, being in contact therewith. These extra rails, if there are two, are placed by preference just inside the ordinary rails, but they may be outside if desired. The clipping or holding parts of the rails are disposed in opposite directions to each other, so as to



" embrace the clips on the carriages; or the reverse may be the case, and the carriage clips arranged to embrace the rails. In either case the carriage clips consist of strong rigid iron supports depending from the carriage or engine framework, the terminations of which are furnished with parts to clip or pass underneath the flange or rib of the extra safety rail," these supports being also furnished with shoe pieces or surfaces which are adapted to slide on the rail and support the carriage in the event of a wheel coming off or breaking. Instead of two safety rails one only may be used, this being placed mid-way between the ordinary rails, and being provided with a head of T-form, each side of which the carriage clip embraces. And in using this "mid-safety rail" the carriages are furnished with struts and shoes, "adapted to take a bearing on the ordinary rails in the event of a wheel or wheels coming off a carriage or breaking."

[Printed, 4d. No Drawings.]

A.D. 1861, March 14.—N° 639. (\* \*)

HUNTER, JAMES.—"Improvements in moulding and shaping metals."

This invention relates to an improved mode of casting wheels, rails, pillow blocks, and other generally similar details, so as to obtain hard and durable surfaces thereto, as well as economy of time and expence in moulding. Under one modification the mould "is made entirely of iron," in two parts, "in manner similar to the ordinary sand moulds; these parts are placed one upon the other, and when so arranged a cavity is left between the parts corresponding to the form of the wheel to be cast. A metal core is arranged in the centre of the mould which passes through the two parts, and this forms the aperture in the centre of the wheel to receive the axle or spindle, which may be either fast or loose. A vertical tubular aperture is formed in the upper half of the mould which conveys the molten metal down into the cavity formed in the body of the mould."

[Printed, 8d. Drawing.]

A.D. 1861, March 15.—N° 657.

WATKINS, JOHN.—"Improvements in railway brakes."

This invention consists in applying a brake drum or wheel "to the centre of each axle. This brake wheel is flanged on both edges of its periphery, and is furnished with wood brake blocks secured by iron straps or grips, which cause the brake blocks to clip the periphery of the brake wheel when in action. The grips are tapped to receive a screw rod or shaft in connection with each pair of wheels under a tender, brake van, or carriage."

"The mode of working the brake may be by any suitable appliances upon the rod or shaft which passes through the grips, by which the brake blocks can be tightened upon the brake wheels, and thus the revolution of the axle and wheels is retarded and gradually arrested, or action may be applied by centrifugal power from the axle, a worm or pinion on the axle working in a spur wheel gearing into a second wheel fixed on the longitudinal screwed shaft. These spur wheels may be thrown in and out of gear by any suitable means, and at the will of an operator, so that the running speed of a train increases the power applied to the brakes."

The invention is set forth in detail, with the exception of that part which relates to working the brakes "by centrifugal power from the axle," the patentee stating that his "experiments shew no decided advantage in thus applying the power," and that he does not desire to claim that portion of the invention.

[Printed, 10d. Drawing.]

A.D. 1861, March 16.—N° 670.

HENSON, WILLIAM FREDERICK.—"Improvements in railway carriage buffer and other springs."

This invention consists "in combining the action of a conical or conoidal spiral steel spring with that of a flat spiral or volute steel spring in such a manner that when being acted upon simultaneously by one and the same plunger, the conical spring shall be compressed whilst the flat volute spring is at the same time extended. These two springs may be either formed in one piece by means of a steel bar being in part coiled round a cylindrical mandril, so as to form a flat volute spring, whilst the remaining portion is coiled round a conical mandril, so as to form a conical spiral spring; or the two springs may be formed separate from each other. The bar of steel of which these

" springs are formed may be either of a rectangular or of a circular section, or the section may be grooved or trough shaped, either parallel or tapering, or the springs may be formed of tubular bars of steel, or they may be of any other suitable sectional form, and such combined conical or conoidal and flat spiral or volute springs may be employed either for buffer or draw bar springs for railway carriages, or for any other purpose to which they are applicable."

The invention is described under various modifications, the patentee claiming in particular "the combination in buffer or draw bar apparatus of conical or conoidal and flat spiral or volute springs, whether formed of one piece, or whether formed separate from each other, and that are so arranged that they are acted upon simultaneously by the buffer rod or draw bar."

[Printed, 10d. Drawing.]

A.D. 1861, March 18.—N° 674.

KRUPP, ALFRED. — (*Provisional protection only.*) — " Certain improvements in the method of securing tyres for rolling stock on their wheels."

According to this invention, as applied to the construction of new wheels, the inventor forms the rim of each wheel " with an angle piece projecting upwards on that side of the wheel on which the flange of the tyre is coincident. This angle piece is either rolled or turned out with a groove on the inside. The reverse side of the rim is turned or rolled, or otherwise formed with a bevil groove on the top or under side as preferred," and the angle piece is "bevilled or curved off" on its outer edge. The tyre "is rolled or otherwise formed of a somewhat reverse form on its under side to the section of the wheel rim, so that when the two come together the parts shall correspond. The face of the rim of the wheel is made slightly on the incline towards the inner edge for the purpose of facilitating the putting on of the tyre," the latter being "passed over the rim of the wheel in the cold or nearly cold state by hydraulic pressure in preference, though the tyre may be slightly warmed and dropped over the rim till the projection on the tyre comes in juxtaposition with the groove in the angle piece of the rim, and the completion of the putting on of the tyre is then done by hammering or by pressure."

In order to adapt the invention to an old wheel such wheel must be first furnished with a "supplementary rim" of similar section to that described above; this supplementary rim being shrunk upon the "first or normal rim" of the wheel, and further secured if necessary by bolts, or by being grooved for the reception of the first or normal rim. The tyre in both these arrangements is secured upon the wheel by being hammered or pressed so as to form an overlap outside the angle piece first mentioned, thus partially embracing that portion thereof which is "bevilled" or curved off."

Different modes of carrying out the invention are described; in some cases the rim being formed without the angle piece, a ring being used instead, which extends both above and below one side of the rim, and having thereon one angle piece which fits into a groove in the tyre, and another which fits a groove on the under side of such rim.

One advantage arising from these arrangements is mentioned as consisting in the tyre being secured to the wheel without the necessity for using bolts or screws.

[Printed, 1s. 2d. Drawings.]

A.D. 1861, March 18.—N° 675.

ARROWSMITH, JOHN.—(*Provisional protection only*)—"New  
" or improved machinery or apparatus for fixing the windows of  
" railway and other carriages at any required height."

On the side of the carriage window frame the inventor fixes  
" a strip of brass or iron in which a series of holes are made, the  
" said series of holes extending from nearly the top to the bottom  
" of the said frame at about two inches apart. In the part of  
" the door in which the window slides is a small lever, the upper  
" end of which is pressed by a spring against the strip of brass  
" or iron on the window frame. A thumb plate connected with  
" the said lever enables the occupant of the carriage to raise the  
" end of the lever from the said plate. In order to fix the window  
" at the required height the thumb plate is pressed and the  
" window raised to the required position. By now liberating the  
" thumb plate the end of the lever is pressed into one of the  
" holes in the brass or iron plate on the window frame, and  
" the window is thereby fixed. By pressing the thumb plate the  
" window may be allowed to fall, but the sudden fall of the

A.D. 1861, March 25.—N° 751.

SPENCER, JOHN, the younger, and SPENCER, MICHAEL.—  
 “Improvements in the manufacture of cast-steel tyres.”

The Specification of this invention is as follows :—

“Our said invention relates to the manufacture or production  
 “of cast-steel tyres or hoops for railway and other wheels, and  
 “consists in casting such tyres or hoops in a solid ring, in a  
 “suitable mould or matrix, which ring is afterwards hammered,  
 “and when necessary may be finished by rolling in the usual  
 “or any other suitable manner.”

[Printed, &c. No Drawings.]

A.D. 1861, March 28.—N° 770.

CHEVILLARD, FRANÇOIS. — “Improvements in machines  
 “worked by concentrated power.”

This invention relates to “a new or improved rotary machine,  
 “worked by concentrated power, in which the piston is sup-  
 “pressed, and in its stead a motive wheel is keyed near to the  
 “concentrated power which acts upon and imparts to it a rotary  
 “motion.”

The mechanism employed consists in fact of a wheel enclosed within a suitable case, and so arranged as to be acted upon directly by steam from the boiler of a locomotive engine, being thereby caused to rotate and so give rotation to the driving wheels of the engine. Different modifications of the wheel are described, in one case the steam being admitted into recesses or chambers formed in the body of the wheel, while in another case the steam acts against teeth formed around the circumference of the wheel, suitable passages being arranged for the entrance of the steam to and its exit from the case in which the wheel works.

The patentee mentions certain advantages as arising from these arrangements, among which he specifies “a more normal motion  
 “and more direct impulse than with the piston cylinder princi-  
 “pally in railway rolling machinery,” and “the application to the  
 “tenders of rolling engines of a motive wheel, which on being  
 “put into communication with the recipient of concentrated  
 “power will serve for the double purpose of traction, and as a  
 “break, and consequently there will be no danger of the ma-  
 “chinery being injured by the impact of the steam.” It is not



stated, however, in what manner the invention is to serve as a break.

[Printed, *ed.* Drawing.]

A.D. 1861, April 3.—N° 821.

WRIGHT, THOMAS, and WRIGHT, HUGH. — "A new or improved steam brake."

This steam brake "consists essentially of a cylinder having a piston working in it. By introducing steam between the cylinder and piston the said piston is made to move in one direction, and the cylinder in the opposite direction," such cylinder and piston being respectively connected either to the ends of brake straps or to brake blocks, which may be made to embrace or press against opposite sides of a wheel, and so bring such wheel and any machine or mechanism in connection therewith to a state of rest.

Different modifications of the invention are described, one arrangement being set forth as more especially adapted for a winding or hoisting engine, such as the winding engine of a colliery, the supply of steam to the cylinder being regulated by a three-way cock provided with a quadrant lever from which a wire proceeds to the mouth of the pit, in this case blocks being pressed upon opposite sides of a brake wheel, while in other arrangements brake straps are used, which act upon a large part of the circumference of the wheel. The invention is obviously applicable to the working of railway brakes, for which reason it is noticed here.

[Printed, *8d.* Drawing.]

A.D. 1861, April 3.—N° 823. (\* \*)

SEVILLE, JOHN, and LAWTON, WALTER. — (*Provisional protection only.*)—"Certain improvements in starting and retarding or stopping railway trains."

"These improvements consist in the employment, in connection with the buffer or framing of the same, of a chamber" conveniently situated for "discharging sand, steel filings," or other "suitable minerals, earths, mixtures, or compositions upon the rails," with the view of "obtaining a firmer hold of the wheels," or preventing them slipping, "and thereby facilitating the starting and retarding or stopping of the train," "the said materials



" being discharged from the receptacle when required " by the opening of the valve in the lower part of the same, and a " flexible pipe or tube employed in connection with the outlet " passage in the lower part of the receptacle for conducting the " sand " to the rails.

[Printed, 4d. No Drawings.]

A.D. 1861, April 4.—N<sup>o</sup> 830.

SHEPARD, WILLIAM ALBERT.—(*Provisional protection only.*)

—" Improvements in street railways, and wheels, and apparatus " to be used therewith."

According to one part of this invention a street railway is composed of a combination of rails of dissimilar section, the wheels of the carriages which are to run upon such rails being adapted thereto. One rail, which acts as a guide rail, has two flat surfaces or wheel tracks, one on each side of a raised centre rail which runs continuously with the flat surfaces. The raised portion of the rail may be of rounded or angular form, or in place of a raised rib or rail a groove may be formed between the two plain surfaces, suitable for receiving a flange on a wheel. The other rail, which is to be laid parallel to the one above described is (wherever the track is straight or the curves are not too abrupt) a simple flat rail of the same width as the other. Both these rails are to be laid flush with the street. The wheels have each two flanges, these running upon the flat surfaces at the sides of the raised centre of the rail (when such a rail is used) the raised part of the rail thus acting as a guide to the wheels. The wheels are each in two parts, the plane of division being perpendicular to the axle of the wheel, and one part of the wheel being fixed upon and revolving with the axle, while the other is loose upon such axle, this arrangement preventing the two flanges from binding on a curved way and running off the guide rail. When a grooved guide rail is used the wheels are each furnished with a projecting band or ring which works in the groove. Should a single guide rail be found insufficient a guide bar, having at its lower end two small guide wheels, may be so arranged that one of the latter may run upon each side of the curved portion of the rail, slightly in advance of the forward wheel, this bar being free to turn slightly to suit a curve, and to work up in a slot for a given distance

against a wire spring so that it may pass over an obstruction on the rail without raising the car, and then being pressed down by a spring at once resumes its place, thus holding the carriage steady while the wheels pass over the same obstruction. A stiff wire brush, presenting an acute angle in front, may be placed forward of this bar, or of the wheels, to keep the rails clear from dirt or stones.

"When a groove in place of a raised rib or rail is used a single wheel suitable to run therein and be guided thereby will be employed on the bar above-mentioned."

[Printed, 4d. No Drawings.]

A.D. 1861, April 5.—N° 838.

**RICHARDSON, WILLIAM.**—(*Provisional protection only.*)—

"Improvements in carriage and other axles, and also in shafts and other parts of machinery exposed to the action of the atmosphere."

This invention consists in coating, covering, or insulating carriage and other axles, as also shafts and other parts of machinery exposed to the action of the atmosphere, with or by the use of vulcanized india-rubber, india-rubber cloth, gutta percha, or other material capable of excluding moisture and air.

The inventor mentions that it is well known that the principal cause of the breaking of the axles of railway carriages are "oxidation of the metal by exposure to wet, and crystallization by the unequal expansibility and contractibility in different directions by heat and cold," and that "the object and intention of this invention is to protect the metal both from wet and unequal expansion, and thus to prevent oxidation and crystallization thereof," by "insulating the metal as above stated."

[Printed, 4d. No Drawings.]

A.D. 1861, April 5.—N° 840.

**STORER, CHARLES, JONES, RICHARD, and STORER, JAMES.**—(*Provisional protection only.*)—"Improvements in railway brakes."

According to this invention a longitudinal shaft is fitted to each carriage, the ends of the shafts of the different carriages being connected by means of couplings, each of which is com-

posed of "a fork-like piece jointed to one shaft, the forked end " of which is received in longitudinal grooves formed in the other " part of the coupling jointed to the adjoining shaft," such coupling "while rigidly communicating torsion" being "free to " afford the necessary play between the carriages." On each shaft, near the middle of the length of the carriage, is placed a drum or barrel, to which chains are appended, there being connected to these the free ends of weighted levers "disposed " transversely to the carriage, and extending nearly from side to " side of the framing. These weighted levers are connected with " other levers carrying the friction surfaces of the brakes," and " which are conveniently of a cranked form." When the brakes are not required to act the longitudinal shafts are turned by hand, through the medium of suitable gearing, so as to raise the weighted levers and keep the brakes clear of the wheels, and the parts are then kept in this position by means of a ratchet and pawl or other convenient mechanism until it is desired to apply the brakes, when by releasing the pawl from the ratchet, or otherwise setting free the weighted levers, the latter immediately descend, pulling round the longitudinal shafts, and forcing the brakes against the wheels of the carriages.

[Printed, 4d. No Drawings.]

A.D. 1861, April 13.—N° 910.

DELANNOY, ALBERT FRANÇOIS.—"Improvements in boxes " and in bearings for lubricating the axles and journals of wheels, " also applicable to lubricating the shafts or axles of machinery " in general."

This invention relates to improvements upon the invention for which a Patent was granted to the present patentee on the 6th of August, 1859, No. 1818; and these improvements consist, firstly, in constructing the axle box in one piece, "with an opening of " an elliptical form, where used for revolving axles with fixed " wheels and the collar at the end of the journal." The box is provided with a brass bearing, which partly surrounds the journal, such bearing having on its upper part a projecting piece or key provided with an opening which receives the end of a set screw by which the bearing is secured to the box, the latter being provided with the necessary holes for a metallic ring which acts upon the packing used to make the box air-tight, and for the "fixing

"bolts" of such ring, the packing consisting of either a leather washer or a "caoutchouc'd cord, known as Tuck's cord."

Another part of the invention consists in an improved method of constructing the oil box, "whereby the oil is maintained tangentially to the journal," and in a lubricating apparatus which conducts the oil to the journal "when the level is lowered." "A wick or cloth is held in contact with the axle or journal by means of a T-formed bracket working in guides in the sides of the oil box, the lower part of such bracket being hollowed out to receive a spiral spring which is attached to a screw plug fitted into the bottom of the oil box, the wick being attached by a spring to the top of the T-bracket it is forced against the axle or journal by means of the spiral spring before mentioned, thus lubricating the journal, and when the oil gets below the wick the lubrication is effected by capillary attraction."

[Printed, 8d. Drawing.]

A.D. 1861, April 23.—N° 1007.

MARSHALL, JOHN.—(*Provisional protection only*).—"Improvements in apparatus used for retarding and stopping railway carriages, and in the construction of railway axles."

According to this invention certain iron plates are passed from one axle box to another of a railway carriage, one plate being outside and the other inside the wheels, the latter plates carrying false axle boxes which embrace without actually touching the axles and the naves of the wheels, which are extended inwards, these false axle boxes serving, however, to support the body of the carriage and keep the wheels in their places in case of fracture of the axles. The plates which pass from axle to axle also sustain skid breaks, which are suspended therefrom by links and levers, which are connected to cross shafts having upon them other levers, the latter, again, carrying nuts through which pass screws carried by a longitudinal shaft, so that by causing the latter to rotate, which may be effected by any suitable means, the skid breaks may be forced down upon the rails so as to lift the carriage from them. The longitudinal shaft of one carriage is connected with that of another by double joints and a screw shackle, and the skid breaks themselves are constructed of wrought iron plates having blocks of hard wood between them, there being between the lower portions of such plates blocks of cast iron faced with

some "compound metal," these forming the friction surfaces which act against the rails, the plates descending below these blocks and forming flanges which pass on each side of such rails. A mode of putting the breaks into action "by the momentum of " the carriage " is described as consisting in the use of certain gearing and friction apparatus mounted upon one of the axles of a carriage, the friction apparatus being placed in and out of contact at pleasure by bent levers and rods or other suitable means communicating with the guard's compartment of the train. Different arrangements, embracing the use of screws working with toothed sectors, wheels with endless chains, and other mechanism, are described as applicable for working the breaks, in some cases two sets of breaks being used, one set rising when the other set descend, the "active breaks" being always in front of the wheels. By this arrangement "it does not matter which end of the " carriage is foremost."

The invention includes a mode of constructing axles hollow, and placing inside each axle a rod of wrought iron, the rod, however, not quite filling the hollow part of the axle, and the space between them being filled by running into it some metal or compound which is softer than iron, and which is "a bad conductor of vibration." A mode of forming such axles in three parts is also described, the central part having the ends tapered, and the wheels being driven upon such ends until the latter are half way through the naves, and the outer and bearing ends of the axle being then driven into the naves so as to meet the ends of the central portion, these outer parts being tapered where they enter the naves, and the holes in the latter being shaped to correspond with the tapering of both central and end parts. Screw caps are in both cases placed at the outer ends of the axle.

[Printed, 4d. No Drawings.]

A.D. 1861, April 25.—N° 1033.

LEFOL, PIERRE CASIMIR.—"Improvements in the manufacture of iron wheels."

The wheels made according to this invention are intended "principally for railway carriages," and such wheels are formed by placing one upon another several parcels or piles of iron, each composed of several pieces or bars, and in a heated state, the whole being then welded together by a pile hammer "of sufficient



" weight to reduce the mass by means of dies or stamps into the  
 " required form, viz., the rough form of a wheel," a hole being  
 then formed in the centre, and an axle passed through it, and  
 " the rough wheel thus formed being afterwards submitted to  
 " the action of conical rollers. The roller cones are set in move-  
 " able bearings, which allow the cones to be placed nearer or  
 " further apart as required. The necessary circular and lateral  
 " motions can be then given to the cones without changing the  
 " relative position of the bevil or driving wheels, which is  
 " effected by means of catchings and axles, movable in all  
 " directions."

The distance between the rollers is adjusted by means of screws, by turning which they may be brought gradually nearer together until the wheel has been brought down to the proper thickness, a roller of different shape from the rest being used to form the outer circumference of the wheel.

The wheel may be made " with or without a tire," in the latter case the outer circumference of the wheel being grooved, and a heated tire then shrunk thereon, such tire in contracting forming a protuberance or rib which enters the groove, but does not fill it, this arrangement giving elasticity to the wheel.

[Printed, 10d. Drawing.]

A.D. 1861, April 25.—N° 1036.

GARDINER, PERRY GREEN.—" Improvements in the construction of springs."

This invention relates to the formation of springs for railway vehicles, and which may also be used for other purposes. According to one mode of carrying out the invention a series of concentric steel discs, of different diameters, are placed upon a ferrule, holes being made in them to receive such ferrule, " so that said  
 " ferrule only acts upon the discs near the centre thereof," and a dished cup or piece of metal being placed over the discs, which not only confines them at the circumference, but prevents the access of dust or moisture thereto. " The series of discs are connected together, and to the dished cup and ferrule aforesaid," by a bolt passing through the same, " and tightened by a screwed  
 " nut."

According to another mode of carrying out the invention, a series of corrugated, conical, or dish-shaped discs of steel, of



different diameters, are placed upon a ferrule, as in the first arrangement, there being placed between each two plates a soft or malleable substance, such as felt, india-rubber, copper, or other suitable material, "to give a solid bearing to the series of plates." Instead of covering these plates with a dished cup, however, as in the arrangement mentioned above, a second series of corrugated discs is placed upon the same ferrule, the arrangement being such that the edge of the largest disc of one series comes into contact with the edge of the largest disc of the other, the corrugations of the first fitting into those of the second, and dust or dirt being thus prevented from entering between the two discs. A thick ring of india-rubber may also be placed between the two series of discs, which in the event of the spring being subjected to great pressure will serve as a spring.

Different modification of the details of the invention are described, in some cases two or more springs being combined together.

[Printed, 8d. Drawing.]

A.D. 1861, April 26.—N° 1055. (\* \*)

MARSHALL, JOHN.—"Improvements in preventing the fracture of metals from crystallization."

"My invention consists in coating, covering, or surrounding all metals, whether simple or compound, which, when in use, are in a state of motion, accompanied by vibration from percussion or any other cause, with a coat or covering of a simple or compound metal, or other material of a softer nature than that of the metal to be protected from crystallization, and in again coating, covering, or surrounding the core, protected as described, with any metal that may be thought fit that is hard enough to form the frictional or outer surface."

In applying this invention to a railway carriage axle, a rod or core of wrought iron or steel has screw threads cut upon its ends; a tube of larger internal diameter than the diameter of the rod is slid over the rod, and a coat of soft metal is run in between the rod and the tube, "both tube and core being raised to a temperature equal to that of the melted soft metal." Suitably-shaped nuts are kept screwed upon the above-mentioned screw threads during the cooling, and the contraction of the tube "sets and binds all tight."

When the invention is applied to shafts at the bearings only, the outer hard metal tube is fastened to the core by means of under cut collars. Having put the tube in its place in the rebate of the collar already fixed, the soft metal is run between it and the cord, and the remaining collar is shrunk on hot.

Other applications of this invention are set forth.

[Printed, &c. Drawing.]

A.D. 1861, April 27.—N° 1060.

POOLE, JOHN, and MILWARD, WILLIAM.—“Improvements in the construction of hoops or tyres for wheels to be used on railways and tramways.”

The object of this invention is to construct a tyre “without the usual cross weld or joining ‘shet,’” which is effected by passing a bar of iron, or steel, or of iron and steel combined, or of any other suitable metal, “edgeways through or between three suitable grooved or plain rollers fixed and mounted in an iron frame, the lines joining their centres or axes preferably forming with each other an equilateral triangle. These rollers are caused to revolve by wheel gearing or other requisite appliances,” and thereby bend or curve the bar under operation into a concentric spiral, helical, or corkscrew form. It is then to be subjected to the process of welding, so as to bring the series of rings into one piece, after which it can be again passed between other rollers of the necessary form according to the cross section of the tyre, with the requisite flange for affixing on the body of the wheel,” the patentees stating, however, that in lieu of “such latter process,” it can be brought to its required shape during the welding, or afterwards, by means of hammering in dies or swages; and that they further “intend or propose constructing the said tyre of single concentric rings, bent or curved by the means aforesaid, or by the usual manner, and then piled or placed on each other with their ends so arranged as to cross or break joint prior to the welding process before mentioned.” Different modes of bending the bar may be adopted, and the “section of tyre” may be varied.

[Printed, &c. No Drawings.]

A.D. 1861, May 1.—N° 1085.

BRAMWELL, FREDERICK JOSEPH, and OWEN, WILLIAM.—

“Improvements in the manufacture of rails, bars, plates, cylin-

different diameters, are placed upon a ferrule, as in the first arrangement, there being placed between each two plates a soft or malleable substance, such as felt, india-rubber, copper, or other suitable material, "to give a solid bearing to the series of plates." Instead of covering these plates with a dished cup, however, as in the arrangement mentioned above, a second series of corrugated discs is placed upon the same ferrule, the arrangement being such that the edge of the largest disc of one series comes into contact with the edge of the largest disc of the other, the corrugations of the first fitting into those of the second, and dust or dirt being thus prevented from entering between the two discs. A thick ring of india-rubber may also be placed between the two series of discs, which in the event of the spring being subjected to great pressure will serve as a spring.

Different modification of the details of the invention are described, in some cases two or more springs being combined together.

[Printed, &c. Drawing.]

A.D. 1861, April 26.—N° 1055. (\* \*)

MARSHALL, JOHN.—"Improvements in preventing the fracture of metals from crystallization."

"My invention consists in coating, covering, or surrounding all metals, whether simple or compound, which, when in use, are in a state of motion, accompanied by vibration from percussion or any other cause, with a coat or covering of a simple or compound metal, or other material of a softer nature than that of the metal to be protected from crystallization, and in again coating, covering, or surrounding the core, protected as described, with any metal that may be thought fit that is hard enough to form the frictional or outer surface."

In applying this invention to a railway carriage axle, a rod or core of wrought iron or steel has screw threads cut upon its ends; a tube of larger internal diameter than the diameter of the rod is slid over the rod, and a coat of soft metal is run in between the rod and the tube, "both tube and core being raised to a temperature equal to that of the melted soft metal." Suitably-shaped nuts are kept screwed upon the above-mentioned screw threads during the cooling, and the contraction of the tube "sets and binds all tight."

When the invention is applied to shafts at the bearings only, the outer hard metal tube is fastened to the core by means of under cut collars. Having put the tube in its place in the rebate of the collar already fixed, the soft metal is run between it and the cord, and the remaining collar is shrunk on hot.

Other applications of this invention are set forth.

[Printed, 8d. Drawing.]

A.D. 1861, April 27.—N° 1060.

POOLE, JOHN, and MILWARD, WILLIAM.—“Improvements  
“in the construction of hoops or tyres for wheels to be used on  
“railways and tramways.”

The object of this invention is to construct a tyre “without  
“the usual cross weld or joining ‘shet,’” which is effected by  
passing a bar of iron, or steel, or of iron and steel combined, or  
of any other suitable metal, “edgeways through or between three  
“suitable grooved or plain rollers fixed and mounted in an iron  
“frame, the lines joining their centres or axes preferably forming  
“with each other an equilateral triangle. These rollers are  
“caused to revolve by wheel gearing or other requisite ap-  
“pliances,” and thereby bend or curve the bar under operation  
“into a concentric spiral, helical, or corkscrew form. It is then  
“to be subjected to the process of welding, so as to bring the  
“series of rings into one piece, after which it can be again passed  
“between other rollers of the necessary form according to the  
“cross section of the tire, with the requisite flange for affixing  
“on the body of the wheel,” the patentees stating, however, that  
in lieu of “such latter process,” it can be brought to its required  
shape during the welding, or afterwards, by means of hammering  
in dies or swages; and that they further “intend or propose con-  
“structing the said tyre of single concentric rings, bent or curved  
“by the means aforesaid, or by the usual manner, and then piled  
“or placed on each other with their ends so arranged as to cross  
“or break joint prior to the welding process before mentioned.”  
Different modes of bending the bar may be adopted, and the  
“section of tyre” may be varied.

[Printed, 4d. No Drawings.]

A.D. 1861, May 1.—N° 1085.

BRAMWELL, FREDERICK JOSEPH, and OWEN, WILLIAM.—  
“Improvements in the manufacture of rails, bars, plates, cylin-

"ders, vessels, axletrees, cranks, wheel tyres, and other articles of wrought iron or steel, and also in the machinery used in such manufactures."

One part of this invention relates to the formation of railway tyres, and consists in placing an annular pile of metal in a mould fixed upon the face of an anvil, or attached to the face of a hammer, the anvil being in either case furnished with a chamber for the reception of a mandril, "which is raised up through the anvil and the annular pile." The pile is hammered until sufficiently consolidated, and the mandril is then, by means of a piece introduced between the hammer face and the end of the mandril, driven into the recess in the anvil, and there secured; the hammered annular pile being thus fed from the mandril, and removed from the mould with facility.

Another part of the invention relates to the manufacture of cast steel tyres, and consists in casting a ring of greater width than the finished tyre, and then hammering this ring in a suitable mould in order to reduce its width, render it suitable for rolling into a finished tyre hoop, and consolidate it.

Another part of the invention consists in bending a rail which has been reduced by wear into a circle, joining the ends together if necessary by welding, then heating the ring thus made and rolling it between rollers bearing on the outside of it, so as to diminish the diameter of the hoop and increase its section when the ring is to be cut at the part where it has been welded, and opened out into a rail of the full section of a new rail, but shorter than the original. This rail may be opened out by hand or by passing through rollers, or it may have its section regulated by being so passed through rollers. "Worn tyre hoops may be treated in a similar way by heating and rolling, so as to make them into smaller and thicker hoops, and thus render them fit to be used on smaller wheels than those on which they have first been employed."

Another part of the invention consists in forming a railway axle "from a pile of the whole length, or nearly of the whole length of the axle," this pile being composed of numerous bars, and being stamped, rolled, or hammered into such a form that the whole will present somewhat of the outline of the finished axle. This pile is then placed in a mould, having the shape of the lower half of the finished axle, and beaten with a mould which forms the other half, the pile being thus welded together. Occa-



sionally this operation will leave a "fin" at the sides of the axle, which may be removed by any ordinary means, and the axle may further be finished by rolling or swaging.

The invention further includes various arrangements for rolling rails and tyres, as well as other articles, in which both grooved and other rolls are used, and wedges and screws, or levers combined with hydraulic presses, are used to create the requisite pressure upon the article under operation. The details of the invention are set forth at great length, such details embracing various matters not connected with the present series of abridgments.

[Printed, 6s. 4d. Drawings.]

A.D. 1861, May 2.—No 1106.

WRIGHT, PETER. — "Improvements in the manufacture of wheels, and in apparatus or machinery to be employed therein."

In setting forth this invention the patentee says:—"I first prepare a die of the requisite section to give the desired form of one-half of the nave of the wheel, with a flange upon the periphery of the thickest part of the nave. I then take wrought or scrap iron, and heat it in a furnace until it is ready for my purpose, when I lay it in the die and force it into the die by blows from a steam or forge hammer, or by pressure applied until the heated metal completely fills the die. I then remove the metal from the die, and take it to a hydraulic or other suitable press, by which a hole is made through the centre for the axle; the corresponding half of the nave is then formed in the same manner. I then take a disc or circular plate of wrought iron or boiler plate of the requisite size or thickness, through the centre of which a hole is cut corresponding with the hole through the nave, and the whole is rivetted or bolted together; Or in another way I can take two discs of plate iron, and placing them one on each side of the flange upon the nave, I rivet or bolt them together through the flange; or when a lighter wheel is required segmental pieces or arms may be rivetted or bolted on to or between and through the flange upon the nave in place of the solid disc. The next operation is that of fixing on the tyre, which may be effected in various ways, either by rivetting or bolting the disc or centre part of the wheel to a flange formed in the inner periphery of the tyre, or



" by rivetting T or angle iron upon the rim of the centre part,  
 " when the tyre may be shrunk on and secured in the usual  
 " manner, or by any other approved mode."

Different modifications of the invention are described, suitable for the production of either plate wheels, or wheels with arms, the patentee mentioning particularly, as one part of the invention, the application of a punch, fitted upon the head of the ram of an hydraulic press, furnished with a die in the bed of the press, by which means the hole for the axle is punched out whilst the nave is hot. In some cases wheels are formed with naves or bosses of cast iron, instead of having naves or bosses produced as mentioned above.

[Printed, 10d. Drawing.]

A.D. 1861, May 4.—N° 1129.

WILSON, EDWARD BROWN, and TIJOU, WILLIAM.—(*Provisional protection only.*)—" Improvements in the manufacture of  
 " railway wheels, tires, and other annular, cylindrical, and hollow  
 " articles from cast steel or malleable cast iron, and in the  
 " machinery or apparatus employed therein."

According to this invention it is proposed to form the article required by the use of an expanding mandril, in combination with suitable compressing and shaping dies, " whereby a lateral pressure or expansion of the metal under treatment is effected  
 " simultaneously with the vertical or direct pressure of the dies," this peculiar combination being set forth as being " particularly  
 " applicable to the manufacture of railway wheels and tires."

In manufacturing a railway tire, a blank, formed by any suitable means, is placed in a suitably shaped die, the expanding mandril being then introduced into the interior of the tire. This mandril consists of a conical metal plug surrounded by a series of metal segments or sections, the outer ends of which bear against the inner circumference of the tire, and such segments or sections being forced outwards by forcing down the conical plug, which may be effected by either hydrostatic or other pressure, the sections or segments thus squeezing or expanding the tire in a lateral direction into the cavities or interstices of the die, " which  
 " is so shaped as to give the desired finished shape to the tire."  
 In making railway and other wheels, the expanding mandril is applied inside the bosses or naves of the wheels, " and its descent

" may be effected by the descent of the top die, which may be made to press upon it," the top die and mandril thus operating simultaneously, and it is further proposed, in making compressed metal railway and other wheels " to form the web of a curved, " dished, or concavo-convex form, in order to allow for contraction " in cooling."

The invention also embraces a mode of rolling the head or flange of a solid disc railway wheel, which is effected by placing the wheel between a pair of face plates mounted upon a rotating shaft, and causing suitably shaped rolls, which are arranged round the periphery of the wheel, to " compress and consolidate the " metal of the wheel towards its centre, and to widen laterally " the tread of the tire, an edge roller being employed for furnishing the edge thereof."

[Printed, *4d.* No Drawings.]

A.D. 1861, May 6.—N<sup>o</sup> 1138.

JOHNSON, WILLIAM.—"Improvements in railway carriages " and locomotive engines."

According to one part of this invention, in order that a railway carriage may be rendered more suitable for traversing the curved parts of a line of rails, the body of the carriage is mounted upon two trucks or under carriages, there being suitable springs interposed between the axletrees and the main body of such carriage. Each truck is mounted upon two or more pairs of wheels " sufficiently near together" to admit of their passing easily round a sharp curve, and the axles of the trucks may turn in bearings or boxes such as usually employed, or they may revolve in bearings extending from the nave of one wheel to that of the other on the same axle, in which case the axle should only touch the bearing at intervals, and the spaces thus left be kept well supplied with lubricating material. In addition to flanged wheels of the ordinary character the trucks are provided with disc wheels, placed upon horizontal shafts, and so placed that they " descend " below the top surfaces of the rails, and come against their " sides only," these disc wheels aiding the bearing wheels to keep the trucks upon the rails.

The body of the carriage is connected at one of its ends to the end or near the end of one of the trucks by a vertical axis or pivot, the other end of the carriage being in like manner con-

nected to one end of the other truck, the other ends of the trucks being connected together by such means as will admit of their passing round the sharpest curves which may be found in the line of rails upon which they have to travel. In place of having buffers at or near each side of each carriage, it is preferred for the purposes of this invention that "there should only be one line of " buffers in a train of railway carriages, and that that line of " buffers should be in the centre of the carriages," but the construction of the buffing apparatus may be varied.

In applying the invention to a locomotive engine, the trucks may not only be independent of each other, but be propelled by separate engines, the boiler, however, resting upon both. The details of such an application may, however, be greatly varied.

[Printed, 1s. 6d. Drawings.]

A.D. 1861, May 16.—N<sup>o</sup> 1245.

WATSON, ALEXANDER T.—"Springs for railroad cars and for " carriages, and for many other purposes for which springs are " used or required."

According to this invention a framework or setting is in the first place provided for the reception of steel plates which constitute the spring, this framework consisting of an upper and a lower part, placed at some distance asunder, but connected, if desirable, by an interlocking joint, formed by a projecting piece from each entering an opening in the other, the two parts being thus capable of advancing towards or receding from each other, but being incapable of horizontal action. In each of these parts are recesses or jaws, and into these are inserted the ends of flat steel blades, of different length and curvature, the ends of the blades being rounded, and thus upon pressure being exerted upon the upper part of the framing (for example), the longest blades are acted upon first, and as the pressure increases, those next in length, and so on in succession, "the spring thus graduating " itself to the load." The blades are arranged in pairs, their position being vertical, or nearly so, and the different pairs may be of different thickness, as well as of different length and curvature. In order to sustain the blades in case of extreme pressure being brought to bear upon them, the two parts of the frame are furnished with curved projections, against which the blades in such a case will rest.

[Printed, 6d. Drawing.]

A.D. 1861, May 17.—N° 1258.

DUNN, THOMAS.—“Improvements in machinery and apparatus for altering the position of locomotive engines, carriages, and goods, and preventing injury and accidents on railways.”

One part of this invention consists in “the application to railway engines and carriages of cross beams or projections taking into or bearing upon side rails or frames, for supporting the engine or carriage in case of the breakage of a wheel or axle, or other accident.” Various modifications of this part of the invention are described. In one case a carriage is set forth below the body of which are two or more strong cross beams, the ends of which travel between angle irons carried by posts on each side of the railway, this arrangement causing the ends of the cross beams to rest between the angle irons and so support the carriage in case of an accident to any of the wheels or axles. A similar arrangement may be applied to an engine. In other arrangements the beams are provided with clips which fit upon each side of rails carried by posts, while in other cases they are furnished with angle and other irons according to circumstances.

Another part of the invention consists in the application to railway engines and carriages of “double axles,” by which such engines and carriages would be supported in case of accident, these double axles consisting essentially of a solid wrought-iron axle, enclosed in a tubular axle of cast iron. The latter may be cast in one piece with the naves of the wheels, the two axles being connected together by a key, or by other convenient means, so that they may revolve together. Different modifications of this part of the invention are also described, in some cases the hollow axle being formed by prolonging the bosses of the wheels, so that they may meet in the centre and be bolted together, while in other cases the hollow axle is composed of tubes bolted to flanges cast upon the naves of the wheels. In another case the hollow axle is composed of a wrought-iron tube, “and the spokes of the wheels are formed by bending up the ends of the plate of which the tube is made.” The other parts of the invention do not require notice here.

[Printed, 5s. 8d. Drawings.]

A.D. 1861, May 17.—N° 1261.

ALLAN, ALEXANDER.—“Improvements in locomotive steam engines, and in buffer and draw springs for the same, and for other railway rolling stock.”



One part of this invention is designed to obtain an increased adhesion of the driving wheels of a locomotive engine upon the rails, to facilitate the ascension of inclines, and the starting of heavy trains, and overcome slipperiness of rails and other hindrances, the patentee stating that the same appliances "may also be used continuously to correct a faulty adjustment of the weight of the locomotive engine. To this end provision is made for causing the weight of the engine to bear more exclusively upon the driving wheels when extra adhesion is wanted, and this is effected, according to one plan, by means of a steam cylinder or cylinders acting directly or through a lever or levers in such a way as to bear up the locomotive, as it were, upon the driving wheels as fulcrum," certain levers and springs being employed in other modifications.

Another part of the invention relates to buffer and draw springs, and has for its object "the obtaining of increased action or power in a given space, or an equivalent reduction of the dimensions or strength of the individual springs. The springs to be used in carrying out these improvements are conic volute springs of various sections, and of uniform or varying thicknesses of steel; and they are also applicable with flat volute springs (which assume a conical form on being strained), and with springs of rubber or caoutchouc, or of steel and rubber combined." Different modifications of this part of the invention are described, the patentee stating, however, that in all cases the separate springs (or at least two of them where more than two are employed) are arranged to receive the strain directly and independently, and not through each other, so that they offer very convenient means for giving increased resisting power with a given traverse and space, and they also act in the same line, so that they have no lateral or torsional action whether they are of equal or unequal strengths."

The other parts of the invention contain nothing which requires notice here.

[Printed, 1s. Drawing.]

A.D. 1861, May 27.—N° 1330.

CHURCHILL, Lord ALFRED SPENCER, and SCHENLEY,  
EDWARD WYNDHAM HARRINGTON.—(A communication from

*Archibald Hamilton Rowand.*)—"Improvements in buffing and coupling apparatus for railway carriages."

"For these purposes a case or box is fixed to a carriage containing a system of springs, which are capable of being pressed towards the sides of the box and away from each other," and a "wedged or heart shaped block" connected to another carriage is so arranged as, in case of a sudden check being given to the movement of the carriages, to be pressed in between the springs, the resistance increasing as the block is "more and more forced in" between such springs. This block is formed on or forms part of the stem to which the coupling links are attached, and when the carriages are again moved forward, the wedge or heart shaped block is again drawn outward from between the springs, the latter themselves aiding to force the block back, this, however, being effected "without that sudden reaction which other forms of buffer are liable to."

[Printed, *col.* Drawing.]

A.D. 1861, June 6.—N° 1421.

DE MIRIMONDE, LÉON JOSEPH POMME.—"Improvements in axle boxes, and in lubricating the parts therein."

This invention consists of improvements upon the invention for which a Patent was granted to the present patentee on the 18th of October, 1856, No. 2443, in which the journal of the axle is made to revolve in contact with two friction rollers, placed saddlewise upon it, and in which the lubricating matter is supplied through annular bands of some such flexible material as wool, felt, flannel, and the like.

The first part of the present invention consists in placing in the lower part of the axle box "bearings upon springs, by preference spiral springs, and in placing upon such bearings the axis of a roller, or of two or more narrow rollers, formed by preference of two parts meeting at the periphery, but with a space or hollow between the centre and periphery of each part," this roller, or these rollers, being pressed up by the springs, and revolving in oil. "When the rollers are formed of two pieces, the oil penetrates into the interior, and, oozing out through the slit which divides them, keeps up a supply of lubricating matter should the oil in the bottom of the box fall short."



The second part of the invention consists "in making holes or apertures in the friction rollers placed saddlewise on the journal, which holes extend from the circumference to the centre for the purpose of allowing the passage of oil for lubricating the axle or shaft upon which the rollers are mounted, and upon which they are free to revolve." Both upper and lower rollers are furnished with gun metal sockets, and revolve on fixed axes.

[Printed, sd. Drawing.]

A.D. 1861, June 6.—N° 1438.

NEWTON, WILLIAM EDWARD.—(*A communication from Mallat de Bassilan.*)—"Improvements applicable to railways, for the purpose of facilitating the transport of carriages containing goods and passengers across arms of the sea, rivers, lakes, or inland waters."

This invention relates to a "maritime railway," which is so called by reason of its serving to transport trains and their loads from land railways across the water, and is composed, "1st, of a vessel of the ordinary form, furnished with doors behind and before, or at the poop and prow, and provided inside with a special system of rails, some of which are flat, and the others grooved. 2nd, of carriages, waggons, and all kinds of running vehicles, now employed or to be employed upon railways, but separated from their trucks (or carriages proper), and provided with a perfectly firm flooring, and at their sides with small running wheels (or galets in French) which run upon rails specially intended for them; some of these wheels (galets) are flat to their edge, and the others of a rounded form (*à boudin* in French). These carriages or waggons may be also provided with rollers under their flooring. 3rd, of several accessories, such as drawbridges, swing bridges, any hydraulic power, as well as other means, and large strong low carts for the transport of the waggons' galets out of the goods stations, which together complete this maritime railway, the locomotives and trucks of which always remain on land, and are not embarked for the purpose of transit across the water. All these accessories are furnished, like certain quays of the terminus and stations, and of floating docks, with rails according to this system."

"It may now be seen that it is the actual rolling stock or rolling material only which is modified, for it is cut away or separated horizontally at the height of the side framing of the trucks; and that, after having undergone some modification it constitutes the rolling stock of the maritime railway."

The patentee states that the object of this system of railway is the bringing together or prolongation of land railways upon the water, and facilitating the transit of goods by water without it being necessary to break bulk, or unload for the purpose of transit from land to water, and from water to land; from Calais to Dover, for instance, and vice versa."

The details of the invention are described at considerable length, and in a somewhat discursive manner, so much so that it is difficult to discover in what the essence of the invention consists.

(Printed, &c. Drawing.)

A.D. 1861, June 7.—N° 1450.

LEOPARD, WILLIAM.—"Improvements in railway brakes."

This invention relates to the application of brakes to the wheels of railway carriages "by the rotary motion of the wheels and axles themselves," which is effected "by means of frictional contact surfaces or toothed gearing fixed or formed on the axles." For example, a frictional drum or surface, or a toothed wheel, is fixed upon each axle of a carriage, above which is a flat surface or a rack capable of sliding to and fro, and also of rising and descending so as to be placed either into or out of contact with the frictional surface or wheel. When the flat surface or rack is placed in communication with the friction surface or wheel, it is made to slide longitudinally so as to take effect upon a system of cross bars, "whose ends are wedged by it so as to act on the brakes, and apply them with greater or less force to the wheels, and this in the whichever direction it may be moved." The up-and-down motion of the sliding piece or rack is produced by means of a toothed quadrant placed above it, upon the axis of which are certain cams which act when requisite upon the rack or sliding piece, the toothed quadrant being in gear with an endless screw placed upon a longitudinal shaft mounted below the body of the carriage, the shaft of one carriage being connected with that of another through the medium of square ends and sockets, "so that the carriages may be turned

"end for end at pleasure," and the brakes being applied by means of gearing which may be so acted upon by the guard of the train as to cause it to turn the longitudinal shafts, and so bring the different parts of the apparatus into operation. Instead of moving the friction surface or rack out of gear or contact with the friction wheel or toothed wheel on the axle, when it is desired to stop the action of the brakes, by means of the quadrant and cams mentioned above, springs may be applied for that purpose, and instead of friction or toothed wheels, and racks or sliding friction surfaces, endless screws and screw wheels may be used, "or it may be other mechanical equivalents," and the friction or toothed wheels or screws may be fixed on the carriage wheels instead of upon the axles.

Different modifications of the details of the invention are described. In order to "keep on the brake power" after the apparatus which applies the brakes has ceased to act, and more especially when the application of the brakes is effected by an endless screw and screw wheel, a ratchet wheel is placed upon a short shaft which carries the endless screw, and which shaft is raised when the brake has been applied so as to disengage the screw from the screw wheel, the ratchet wheel, however, being in gear with a pawl, which, notwithstanding such rising of the shaft, prevents the ratchet wheel, and consequently the shaft, from turning backwards and releasing the brakes. Two ratchet wheels, having their teeth pointing in opposite directions, and a pawl which may be made to act upon either, may be used, this arrangement allowing the shaft to be turned in either direction, and the brakes may be finally released by disengaging the pawl from the ratchet with which it may be in gear, this being effected by a further rise of the shaft mentioned above.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, June 13.—N<sup>o</sup> 1524.

BLACKBURN, BEWICKER.—"Improvements in applying oil or "lubricating fluid to locomotive and other axletrees."

According to this invention "the vibration or jolting of a railway carriage in motion is made use of to splash the oil contained in a closed vessel introduced into or forming a compartment of the axle box up to an aperture in the upper part of the "vessel or compartment, through which the oil flows out of the

" vessel, and runs down to the journal beneath. A vibrating spring paddle is sometimes applied near the bottom of deep vessels to assist in splashing the oil up from the bottom to the aperture in the upper part of the vessel."

Different modifications of the invention are described. In one case the oil vessel is provided with an aperture for the introduction of oil, which also serves for the admission of air, a sloping diaphragm preventing the oil from returning through such aperture, and another aperture being formed, up to which the oil is splashed by the motion of the carriage, and through which it passes to the journal of the axle, this aperture being furnished, by preference, with a "capillary wick," and a packing or stuffing made of woollen or other capillary material, which is kept in contact with the journal by means of springs, serving to spread the oil "evenly over the under surface of the journal." These arrangements, however, may be varied.

[Printed, 10d. Drawing.]

A.D. 1861, June 19.—N<sup>o</sup> 1579.

BOUSFIELD, GEORGE TOMLINSON. — (*A communication from Conrad B. Lashar.*) — "Improvements in brakes for railroad cars."

The object of the first part of this invention "is to render the pressure of the brake standard, which is now sustained by the framework of the car, available for the purpose of forcing the brake shoes against the running wheels; also to render the brakes of the cars automatic in their operation when the speed of the engine is slackened;" and this part of this invention consists "in combining the bearing of the brake standard with the brake shoes by mechanism in such manner that the pressure exerted upon the bearing of the brake standard is propagated to the brake shoes, and made available in holding them in contact with the running wheels."

Another part of the invention consists in "combining the brake mechanism of the car with a thrust plate, which projects in advance of the bumper of the car, intervenes between the bumpers of the two adjacent cars when the cars are coupled together, and is made available in applying the brake shoes of the car to which it appertains whenever that car surges towards the preceding car," the patentee stating that by this means



" the brake mechanism of the car is operated automatically by  
 " the bumper of the preceding car without the necessity of modifying the bumpers or draught or of connecting the brake mechanism with them."

A third part of the invention consists " in combining the brake mechanism of the car with two reversible thrust plates, one at each end thereof, and capable of being placed either in the line of motion of the bumpers or out of that line of motion, so that the position of each thrust plate can be reversed when the car is run in the opposite direction, the forward one being put in position to be operated by the bumper of the adjacent car, and the hinder one being thrown out of such position."

A fourth part of the invention consists " in the combination of the brake standard with the brakes of the cars, through the intervention of ring plates ;" and a fifth part of the invention consists in " a certain combination of brakes with the brake standard by means of brake beams, levers, rods, and slide bars," the object of this part of the invention being to enable the first part of the invention to be " applied to four-wheeled cars," and that of the fourth part being to enable the brakes to be applied simultaneously, no matter which end of the car travels first.

[Printed, 1s. 6d. Drawings.]

A.D. 1861, June 26.—N<sup>o</sup> 1635.

FLETCHER, HENRY ALLASON.—(*Provisional protection only.*)  
 —" Improvements in railway wheels and tyres."

Under one modification of this invention " the tyre of the wheel  
 " is rolled or made with a feather or central projecting rib formed  
 " on the back or inner surface of the tyre. The sides of this  
 " feather are turned or otherwise shaped to form a dovetail or  
 " wedge-shaped rib, the narrower portion of the rib being next  
 " the inner face of the tyre. The wheel is formed in two halves,  
 " which meet together at the central part forming the boss of the  
 " wheel. The spokes are duplex, and extend outwards a little  
 " from the boss in a diverging or angular direction. Each of these  
 " duplex or double series of spokes is connected at the outer  
 " extremities by a rim. Thus there are two rims arranged parallel  
 " and with their inner faces converging towards the peripheries.  
 " The dovetail feather of the tyre is inserted between the converging faces of the rims, so that when shrunk on the tyre is

“ tightly wedged between the rims. The tyre is further secured  
“ by a bolt passed through the head of each spoke, and secured  
“ on the other side by a nut; or in lieu of this each pair of spokes  
“ may be riveted together, and, if required, a greater number of  
“ these fastenings may be used, or they may be otherwise disposed  
“ round the rim of the wheel. In this way of arranging and  
“ constructing railway wheels the tyres require very little shrink-  
“ ing, and on that account are much stronger, and are less liable  
“ to fracture during frost, and if a tyre should break it cannot fly  
“ off from the wheel, as it is firmly held by the dovetail feather.  
“ Another element of strength is obtained by the peculiar forma-  
“ tion of the tyre, which is not weakened by bolt holes being  
“ formed in it.”

[Printed, 4*l*. No Drawings.]

A.D. 1861, June 29.—N° 1663.

LEOPARD, WILLIAM. — (*Provisional protection only.*) — “ Im-  
“ provements in railway brake apparatus.”

According to this invention “ the momentum of the train is  
“ caused to take effect on the brakes,” this being effected “ by  
“ means of toothed or friction surfaces formed or fixed on the  
“ axles of the carriages,” these being caused to operate on  
longitudinal bars placed above and below the axles, which slide  
at each end in bearings fixed to the framework, such bars having  
rack teeth or friction surfaces corresponding with those on the  
axles, “ so that when pressed on the axles they are propelled  
“ lengthwise, one in the opposite direction to the other.” The  
brake surfaces themselves “ are mounted on transverse bars  
“ stretched from side to side of the carriage,” and they are  
pressed away from the wheels, when not required to act thereon,  
by springs or other suitable means. The longitudinal bars are  
provided with shoulders which, when they are propelled length-  
wise, as mentioned above, act upon the brake bars, and so force  
the brakes against the wheels, “ the one longitudinal bar forcing  
“ two of them (in four-wheeled carriages) in the one direction,  
“ and the other two in the opposite direction, thereby firmly  
“ gripping the wheels,” “ and this in whichever direction the  
“ wheels may be revolving.” The “ toothed or friction bars ” are  
kept out of contact with the toothed or friction surfaces, when the  
brakes are not required to operate, by means of springs or other-



wise, and are placed in contact with them, when requisite, by means of a vertical lever pivoted midway between the bars, and carrying rollers or surfaces which embrace them, this lever, on being moved from the vertical towards a horizontal position, causing the bars to engage with the rotating toothed or friction surfaces on the axles, such lever being moved by means of a toothed quadrant and endless screw; or instead of this arrangement "the parts may be put in communication by means of "toothed or screw gearing."

[Printed, 4d. No Drawings.]

A.D. 1861, July 2.—N<sup>o</sup> 1683.

ADAMS, SAMUEL.—(*Provisional protection only.*)—"Improvements in omnibuses for street railways, part of which is applicable to other carriages."

One part of this invention consists "in a contrivance for locking and disengaging the pole of omnibuses for street railways," this being accomplished by the use of "a double or two-ended lever, which is acted upon by the driver's feet, so that "when the vehicle is off the rails or metals the pole is fixed and the lock in action, and when on the rails the pole is loose and the lock fixed." The fixing of the pole to the lock "is by a pinion bar of iron or steel, having a fork at the lower end; the other end is a bolt," and "the fork end fits on and partly clips the pole when down, and thus fixes it to the lock: the forked pin is moved up and down by being connected indirectly to the foot lever; when the forked bolt is up the bolt end slides into a socket fixed to the landing."

Another part of the invention relates to "a break apparatus which can be worked by either driver or conductor, or both," this apparatus consisting of levers, "two to each hind wheel, one on each side; the levers are acted upon by rods and chains; the long ends of each pair of levers are connected together by chains which have the form of a rhombus or diamond; two opposite corners are connected to two of the levers, and the other corners are connected to the rods, and so on to the rotating break handles; the blocks or rubbers are prevented, when not in use, pressing the wheels by a coil spring."

Another part of the invention relates to an "improved roof stick or 'principal,' consisting of four pieces of wood; the two

“ supporting pieces are dovetailed into the cant rail, and are nearly straight, crossing each other at an angle of about  $17^{\circ}$ ; the upper ends are mortised to two segments which form an **OC** on each side, the centre being of the most convenient, strong, and elegant form for the roof of an omnibus. The travelling wheels revolve on fixed axles, and have oil boxes.”

A “sweeping or scraping apparatus is fixed to the axle, to pass in front of the travelling wheels to clear the metals.”

[Printed, 4d. No Drawings.]

A.D. 1861, July 11.—N<sup>o</sup> 1747.

ADIE, PATRICK.—(*Provisional protection only.*)—“Improvements in apparatus in connection with railway carriage buffers, for preventing damage in cases of railway collision.”

This invention relates “to the application of checks to railway carriage buffers, whereby the recoil is prevented from taking place in cases of collision, and strengthening the springs so as to lessen the effects of such collision. For this purpose bolts or catches are attached to the buffer boxes or carriage, which drop by their own weight, or are pushed home by springs into one or more grooves or notches in the buffer rods when they are driven home, and so fix the buffers there until they are released, which release is effected either by rods or levers, or by a simple tap on the end of the bolts or catches.”

The invention further relates to “the introduction of very strong plates or springs, supported all round or at both ends, which the buffers or rods strike against in cases of collision;” and includes the application of “the friction of a screw or saddle on the buffer rod to release it gradually.”

[Printed, 4d. No Drawings.]

A.D. 1861, July 12.—N<sup>o</sup> 1757.

ADAMS, WILLIAM BRIDGES.—“Improvements in locomotive engines and trains.”

According to the first part of this invention the leading wheels, or trailing wheels, or both, are arranged in such a mode that “each pair of wheels, with their axles, may be made to traverse laterally and in a forward direction, forming a radial curve, so that on curved lines of railway the axle may always point to the

"centre of the curve, and on straight lines the axle may be at a "right angle with the line of rail." These objects are attained by certain arrangements of the axle guards and axle boxes, various modifications of this part of the invention being described. And the invention also includes the construction of the cylinders of locomotive engines "with outside slides;" an arrangement for feeding locomotive boiler furnaces with liquid fuel; certain central buffing and traction apparatus, with "checked side springs" for enabling carriages to "pass freely round curves;" a mode of constructing waggon in two parts so jointed together that they will easily adapt themselves to a curve in the rails, links being so arranged as to form a "rigid connection" when necessary; also a mode of forming carriage or waggon bodies "of planks fastened "together edgewise by bolts;" and a mode of constructing the tyres of wheels which renders them capable of running either on railways or on common roads. The tyres of these wheels are of hollow form outside, and they are thus enabled to partially embrace a rail when running thereon, but at the same time to work freely upon a flat surface. And such wheels may be supplied with "spring tyres" if desirable, or, for working upon rails, with "ordinary flange tyres."

[Printed, 1s. Drawings.]

A.D. 1861, July 15.—N° 1780.

GÖSSELL, OTTO JOHN THEODORE.—(*A communication from Heinrich Ehrhardt.*)—(*Provisional protection only.*)—"An improved combined locomotive engine and carriage."

This invention is thus set forth:—

"The express railway carriage (so called by the Inventor) differs from the ordinary railway train in so far that it is a combination of the three principal parts of an ordinary train, and includes in one body, and mounted upon the same framing, 1, a locomotive engine; 2, a tender to carry water and fuel; and, 3, a carriage or compartments to receive a limited number of passengers. "The whole carriage will not exceed twenty-five feet in length."

[Printed, 4d. No Drawings.]

A.D. 1861, July 29.—N° 1891.

MELROSE, WILLIAM.—"Improvements in the construction of "railway wheels."

This invention relates to an improved method of connecting the tires of railway wheels to their spokes and naves, and consists "in forming the tire in a novel and improved manner for that purpose." Instead of rolling a bar, from which to produce a tire, with a flange at one side thereof only, as usually practised, the patentee proposes to form a bar with two flanges, by so rolling it that two longitudinal grooves are formed therein, one opposite the other, and thus, when finished, its section will be "of the shape of the letter H," one of these flanges being adapted to run upon the rails of a line of railway, while the other flange serves to connect the tire to the rest of the wheel. The spokes and naves are formed "in two parts," or composed of "two similar pieces of wrought iron, each with eight or more spokes connected together by a ring or flange, and a nave or boss projecting only on one side of the arms, the other side or surface being perfectly flat; the flange on the spokes fits into the grooves in the tire," the spokes fitting into certain recessed parts of the inner flange of such tire, "so that one-half set of spokes and nave are inserted into the tire at one side thereof, and the other half set of spokes and nave are inserted into the opposite side of the tire, and the two halves connected together by screws or rivets passed either through the spokes or nave, or both."

The patentee mentions that wheels thus made do not require the aid of screws or rivets to connect the tires thereto, and that such wheels can be easily and cheaply fitted with new tires, and be manufactured at considerably less cost than railway wheels as ordinarily constructed. He also states that he proposes, if desirable, "to form an entire boss on one half of the spokes, and to connect the other half of the spokes thereto by dovetail joints, and screws or rivets."

It must be understood that the bar composing the tire, and which, as already mentioned, resembles in section the letter H, is so applied to the rest of the wheel that the two flanges are in a horizontal position, thus I, the outer flange being provided on one of its edges with the usual guiding flange for keeping the wheel on the rail.

[Printed, 10*l*. Drawing.]

A.D. 1861, August 1.—N<sup>o</sup> 1908.

WALDUCK, HERBERT JOHN.—(*Provisional protection only.*)—

"Improvements in machinery and apparatus for retarding and stopping railway engines and carriages."



This invention consists "in applying the break or the power by  
 " which the momentum of the railway engine and carriages is to  
 " be overcome to a distinct intermediate rail or plate placed  
 " between the ordinary rails of the railway. This intermediate  
 " rail or plate may be connected to the side rails by cross sleepers  
 " or otherwise, or it may be fixed independently of them. The  
 " object of applying the breaking power to a separate rail or plate  
 " is to relieve the rails on which the wheels run of the wear and  
 " tear caused by applying skid breaks on the rails, or by breaking  
 " the wheels."

The breaks may be applied on the top of the intermediate rail, or such rail may be provided with a groove or channel, into which an expanding or other block fits, this block being connected to the engine or carriages. "When the engines and carriages are to  
 " be retarded or stopped the block is acted upon by wedges,  
 " screws, or other equivalents, put into operation by hand or  
 " power. The connection between the break rail or plate and the  
 " ordinary rails is effected by broad tie beams, the flanges of  
 " which answer the purpose of chairs or fish plates for the side  
 " rails, thereby strengthening the permanent way."

[Printed, 4d. No Drawings.]

A.D. 1861, August 10.—N<sup>o</sup> 1993. (\* \*)

STOCKER, ALEXANDER SOUTHWOOD, and STOCKER, ALEXANDER RICHMOND.—"Improvements in the manufacture of  
 " horse-shoes, boot-heels, wheel tyres, rails, and safes."

In preparing bars and plates for the purpose above mentioned according to the invention, puddled bars or plates of wrought iron, are placed in an ordinary converting furnace, and operated upon in the same manner as is generally practised when converting iron into steel. "These bars or plates are intended only  
 " to be partially converted, so as to leave the inner part of the  
 " metal in its fibrous condition, whilst the outer surface or sur-  
 " faces are hardened to a greater or less depth, and on one or  
 " more of its surfaces, as circumstances may require;" they are then formed into "a pile of any desired number also of suitable  
 " length, breadth, and thickness;" the pile is then heated to a fusing or welding temperature, and passed through an ordinary rolling mill, whereby the whole becomes thoroughly incorporated and welded together in one solid mass, and rolled out to dimensions requisite for the purpose intended.

[Printed, 4d. No Drawings.]

A.D. 1861, August 10.—N° 1995.

CLARKE, WILLIAM SAINT THOMAS.—“Improvements in  
“ railway breaks.”

This invention consists “in intersecting the axle or axles of  
“ driving wheels of locomotives transversely with a current of  
“ electricity, and intersecting the axle or axles of the locomotive  
“ and the axle of the tender and carriages, and the axle or axles  
“ of the locomotive and the axles of the tender, luggage vans,  
“ guard’s vans, and waggons or trucks, transversely with a single  
“ or with separate currents of electricity, whereby most efficient  
“ grip or bite on the rails will be obtained.”

The details of the invention are minutely set forth, certain  
tubes or cylinders and other appendages being described as appli-  
cable to the purposes of the invention, such tubes or cylinders  
surrounding the axles of the engine or vehicle, but not touching  
such axles, and carrying upon them discs or pieces of brass or  
other metal between which are coiled the electric wires, certain  
“ binding collars ” also forming part of the apparatus, and a  
regulator furnished with a moveable pointer being used to bring  
the apparatus into and place it out of action as requisite.

[Printed, 10d. Drawing.]

A.D. 1861, August 12.—N° 2002.

GEDGE, WILLIAM EDWARD.—(*A communication from Alfred  
Tabuteau.*)—“Improved breaking apparatus for railway and  
“ other vehicles.”

After making some observations upon the disadvantages  
attendant upon the system of working break blocks by means of  
screws and cranks, frequently adopted, the patentee mentions  
that he has employed in preference “what may be termed knee  
“ power, which (it is believed) was first indicated by the cele-  
“ brated mechanician ‘Poinso,’ ” the advantage obtained by this  
mechanism being duly set forth.

Different modes of carrying out the invention are described, in  
one case a band or ring, carrying three fixed points or studs  
having arms connected thereto, being used, these arms being em-  
ployed in connection with the break lever; while in another case  
a “draw rod” is constructed in two parts, being re-united by



means of a small beam or plate which is jointed thereto, and in each case a hand lever being used to place the apparatus in or out of action, as requisite.

[Printed, 8d. Drawings.]

A.D. 1861, August 12.—N° 2003.

EDWARDS, WILLIAM, and EDWARDS, ELI.—(*Provisional protection only.*)—"Improvements in apparatus connected with "railway breaks."

According to these improvements the inventors "construct, and "by suitable bearings attach to and under the floor of the carriage connected with the usual buffers, or with the buffer springs "of the carriage, or with additional buffers or buffer springs "fitted for the purpose, and also with such breaks as may be "desired to be used or applied, an apparatus which acts upon the "shutting off of the steam, or upon reversing the engine attached "to the train, or upon any other powerful arresting cause on the "whole of the breaks fitted to such carriage," the train being thereby "very speedily brought to a stand."

"The break acts by pressure on the rim of the wheel in the "usual way, and to each carriage any number of breaks not "exceeding the number of wheels may be fitted." "The axle is "attached to the carriage by suitable bearings, causing the axle "either to be a positive fixture, or allowing it a horizontal spring "motion, as may be desired; the upper end of such bar or spring "has a pole, in which the end of the buffer rod fits." Each buffer rod has attached to it, "along one of its sides, three metal "fittings, that next the buffer working on a pin fitted to a hole "in it, the pin having a head, and being fixed at its other end "through a slot in the buffer rod, and rendered fast by a screw "nut or other suitable fitting capable of adjustment." The first metal fitting is attached at its other end by a joint to the second, and that to the third, the connections being so arranged "as to "allow these three pieces to perform, when requisite, a peculiar "horizontal motion." The result of these arrangements is that the buffers bring the breaks into action when necessary, provision being also made, by the employment of certain slides and levers, for the backing of a train when requisite.

[Printed, 4d. No Drawings.]

A.D. 1861, August 15.—N° 2031.

**BETHELL, JOHN.**—"Improvements in the manufacture from  
" steatite of journals, axle-boxes, and bearings, for machinery  
" axles and spindles to work in, smoking pipes, buttons, cruci-  
" bles, and pots for chemical and smelting purposes, and also of  
" a lubricating compound for railway and other carriages."

According to this invention steatite is used for the manufacture of journals, axle-boxes, and bearings for machinery in general, or linings for such bearings, the steatite being used either in the form of blocks or sheets, or in the shape of powder, and being applied in various modes, in some cases being placed in the bearings of an axle so as to be only on one side of such axle, such side not sustaining the weight of the axle. In other cases powdered steatite, which has been purified in a certain manner, is employed, "and this can be used in many ways, as will be  
" evident to all machinists, the object being to keep the axle  
" constantly supplied or rubbed over by the powder of steatite,  
" which will perfectly lubricate it." This may be done "by  
" pressing the powder into a long cup or open box to fit that  
" side of the axle where the weight is not, and then by pressing  
" up the box and the powder in it to the axle by means of  
" springs; or by putting the powder in cups over the axle, and  
" causing it to be pushed or shaken down through holes in the  
" bearings to the axle, whereby the latter will get supplied with  
" the power, which will well lubricate it."

A lubricating compound suitable for railway and other carriages is formed by first grinding and reducing the steatite to very fine powder, then washing it, and if it should contain iron, steeping it in dilute muriatic acid until all the iron is dissolved; the powder being then again washed and dried, and mixed with  
" any of the oils or fats or soapy compounds now used for  
" lubricating in any proportion that may be thought best."

Various mixtures are mentioned as being applicable for lubricating purposes, but the patentee states that many others may be made.

[Printed, 4d. No Drawings.]

A.D. 1861, August 30.—N° 2163.

**HARRIS, JAMES.**—"Improvements in stopping or retarding  
" railway and other carriages and trains, locomotive and sta-

"tionary engines and machinery, together with apparatus  
 "employed therein, which apparatus is applicable to the raising  
 "and lowering of weights and other purposes for which power  
 "is required."

This invention relates to improvements upon the invention for which a patent was granted to the present patentee on the 24th of January, 1857, No. 216, "and consists chiefly in the employ-  
 "ment of air-tight vessels or reservoirs made of metal or other  
 "material, fitted with safety valves and pressure gauges, and  
 "placed in some convenient part or parts of railway or other  
 "carriages, on an engine or tender, in an engine house, manu-  
 "factory, mill, on board ship, or other position." The patentee connects with one or more of these vessels, and communicating therewith by air-tight pipes, cylinders fitted with pistons, the rods of which are attached to the brakes or brake levers, on one or more of all of the carriages as well as the engine and tender. These vessels or reservoirs have air forced into them by means of a pump or pumps, the latter being worked either from the axles of the engine, carriage, or tender, or by hand. "The vessels,  
 "which for convenience may be placed under the seats in railway  
 "carriages, are always kept charged with compressed air by  
 "means of the air pump, so as to operate instantaneously and  
 "simultaneously, when required, on all the brakes. To cause  
 "them to so act a cock or valve is opened, which allows the  
 "compressed air to act upon the pistons connected with the  
 "brakes, the amount of pressure, which is quite under control,  
 "being regulated by circumstances. The brakes are imme-  
 "diately liberated on reversing the three-way cock or valve, which  
 "allows the air to escape from the cylinders."

Various modifications of the invention are described, some of such modifications being adapted for use in hoists, on board ship, and in various other situations.

[Printed, 8d. Drawing.]

A.D. 1861, August 31.—N° 2183.

GORANSSON, GORAN FREDERICK. — (*Provisional protection only.*)—"Improvements in the manufacture of tyres for railway  
 "wheels, and in the apparatus employed therein, part of the said  
 "improvements being applicable to the consolidating or render-  
 "ing homogeneous iron and steel for other purposes."

This invention consists in the manufacture of tyres for railway purposes "of a more homogeneous kind than has been heretofore obtained, by casting the hoops of steel and malleable iron somewhat broader than the wheels intended to be formed from them," these hoops being then "placed in a boss made strong enough to retain the metal in shape under the next operation." Inside this boss, and also inside the hoop to be operated upon, is placed a punch or circular metal piece of the size of the inner diameter of the hoop, and the latter being between the boss and punch, such punch is then operated upon by a "power hammer," the hammer piece of which may be round, so as to cover the whole circumference of the hoop at each stroke, or of the ordinary construction; this hammer being employed "to consolidate or render homogeneous" the metallic hoop; the latter being afterwards rolled to the size required.

The invention may also be applied to rendering homogeneous ingots or other bodies of iron and steel.

[Printed, &c. No Drawings.]

A.D. 1861, September 4.—N° 2193.

WHITE, ARCHIBALD. — (*Provisional protection only.*) — "An improved apparatus for stopping railway trains."

This invention is described at great length, but in a somewhat confused manner, the description including many needless repetitions. The invention consists essentially in the employment of break blocks, which are suspended between the wheels of each side of a carriage, the blocks of each side being connected by rods to a short pipe, which is capable of sliding up and down upon a longer pipe, which descends from and is connected at its upper end to the framing of the carriage, the rods already mentioned having jointed to them other rods, and the latter being connected to a cord, the arrangement being such that on pulling at the cord the short pipe is raised, and the rods connected to the break blocks brought into such a position that the blocks are forced against the carriage wheels, the short pipe being forced downwards by a spring on the cord being again liberated, and the break blocks removed from the wheels. The cord is apparently meant to be connected to a drum, mounted upon a frame, which is capable of being moved up and down so as to bring a toothed wheel on the axis of the drum into gear with a toothed wheel fixed



upon one of the axles of the carriage, or remove such wheel out of gear at pleasure, the wheels, when in gear, causing the drum to rotate, and by winding the cord thereon to apply the breaks as mentioned above. The frame is moved up and down by means of a lever, and suitable apparatus connected therewith. The cord connected with the breaks of one carriage of a train is connected with the cords of the carriages next to it by means of hooks and eyes, and the details of the invention embrace various pipes and rollers for guiding the cords, conical rollers "round which to "coil slacks of cords," and various springs, staples, and other mechanism for controlling the action of the parts.

[Printed, 6d. Drawing.]

A.D. 1861, September 4.—N<sup>o</sup> 2201.

NEWTON, WILLIAM EDWARD.—(*A communication from Léon Isidore Molinos.*)—"Improvements in self-acting brakes, applicable to railway or locomotive engines and carriages."

This invention consists essentially in the employment of "a nipping apparatus, which is made to seize and embrace the "rails." This nipping apparatus is fixed at the lower end of a vertical shaft, which communicates by means of a connecting rod or lever with the traction apparatus of each carriage. When the traction apparatus is in action, as during the regular progress of the carriage, the nipping apparatus is clear of the rails, but on the failure of the traction apparatus, "the traction springs "will act upon the connecting rod or lever of the brake." The wheels are at the same time acted upon by skids, which are made to press against them by means of a weighted lever, which is released by the movement of a catch on the failure of the traction apparatus.

A modification of the invention consists in making the traction spring, on the failure of the traction apparatus, so to act upon a lever as to cause one end of such lever (which is forked) to be brought into contact with a screw or worm on one of the axles of the carriage, this screw or worm then so acting upon the lever that the latter brings the nipping apparatus into action upon the rails.

According to another arrangement, pairs of jaws, which embrace the rails, are worked by a shaft provided with right and left handed screws, which pass through bosses on the jaws. On

this screwed shaft is mounted a flanged wheel, and the whole apparatus is connected to one end of a lever, which is capable of being raised and lowered, and is acted upon by the traction spring. "When this latter is acted upon by the draught on the carriage, the brake apparatus will be lifted up, but should the traction rod or chain break, the spring will allow the brake apparatus to descend, and the flanged wheel to run upon the rail," which will cause the right and left handed screws to rotate, and thereby bring the jaws against the rails, and cause them to bite strongly thereon, and consequently arrest the train."

[Printed, 10d. Drawing.]

A.D. 1861, September 5.—N<sup>o</sup> 2215.

SCOTT, THOMAS.—(*Provisional protection only*).—"Improvements in apparatus for utilizing the surplus momentum of railway trains and other moving bodies, and the waste and surplus power of locomotive and other engines."

According to these improvements the inventor employs the surplus momentum of a railway train "to actuate condensing pumps or other suitable apparatus for forcing air into a tank or reservoir capable of sustaining a high pressure," a "resisting force" being thus obtained which is "capable of retarding motion and of acting as a break or stop appliance."

The inventor mentions that any other description of surplus power "may be utilized in like manner," and that when "the power for working the condensing apparatus is obtained from the motion of a railway train by the revolution of the actuating axle or axles, the power required for such purpose will have a correspondingly retarding effect on the motion of the train by impeding the revolution of such axle or axles, and as the resisting force to the action of the condensing apparatus will, from the increasing density of the air in the reservoir, be augmented at every stroke of the apparatus or revolution of the axle or axles, such retarding effect on the motion of the train will increase proportionally till the momentum is wholly overcome and the train is brought to a stand. The effects of ordinary 'breaks' applied to the periphery of the wheels may be thus attained, with this difference, that while the momentum of the train or other moving body is overcome by a constantly increasing resisting force, such subdued momentum, instead of being



“ entirely wasted or destroyed, as heretofore, is collected and preserved as highly compressed air, to be again used where required as an auxiliary propelling or motive power.”

Different modifications of the invention are described, the improvements being set forth as being applicable to both railway and other engines.

[Printed, *id.* No Drawings.]

A.D. 1861, September 6.—N° 2226.

ALLOTT, WILLIAM, and THELWALL, JOHN.—(*Provisional protection only.*)—“ Improvements in the manufacture of wheel tyres, hoops, and other similar articles.”

According to this invention two rings are in the first place produced, each of which is composed of a bar “ coiled in a helical form, the coil of the one ring being in the opposite direction to that of the other,” and the ends of the bars being tapered off so as to leave an even face on the ends of the helix or side of the ring. One of these rings is made of smaller diameter than the other, and is fitted inside the larger one, and as they are coiled in opposite directions, the joints or seams will cross each other, thereby considerably increasing the strength of the tyre or hoop, which is free from the usual weld, and is not liable to split as ordinary tyres are.” Any desired number of such rings or coils may be inserted one inside another, according to the strength and dimensions of the tyre to be produced, care being taken that no two adjoining coils are in the same direction, in order that the crossing of the seams or joints may be insured. The blank tyre or hoop thus formed is now welded under the steam hammer, and then finished by rolling in the usual or any other suitable manner.”

[Printed, *id.* No Drawings.]

A.D. 1861, September 11.—N° 2259.

RESELL, RICHARD.—(*Provisional protection only.*)—“ Improvements in the means of connecting and disconnecting engines and tenders to and from trains.”

The object of this invention is to enable the driver of an engine to connect and disconnect the tender and engine with and from the train without leaving his place on the engine, and the invention consists “ in attaching to the engine or to the tender a steering

“ which is hinged to a plate, a rod from which passes through  
“ the frame and is connected to an ordinary draw spring ; or the  
“ plate may be fixed. The stirrup has fitted to it and depending  
“ from it a weighted U-shaped bar, while a similarly shaped bar  
“ is connected by loops to the upper surface of the stirrup ; this  
“ latter bar has attached to it a cord, strap, or chain, which is  
“ carried to some part of the engine within reach of the driver ;  
“ the carriage to come next to the engine and tender is fitted with  
“ an ordinary draw hook.”

“ Supposing the driver requires to connect, he first raises the  
“ stirrup by means of the cord or chain, causes his engine to  
“ press up against the carriage, and lowers the stirrup over the  
“ draw hook, into which the weight connected to the under part  
“ of the stirrup causes it to descend and become engaged. To  
“ connect the coupling chains it is necessary an attendant should  
“ hook them on, but there is no necessity for him to enter between  
“ the rails, as the hooking on should be performed outside the  
“ rails on each side ;” but to enable the driver to disconnect the  
coupling chains as well as the central coupling, there is hinged to  
a plate bolted to the engine or tender “ a weighted hook to receive  
“ one end of the coupling chain,” a rod being connected to  
the hook in such manner that it may thereby be raised and the  
coupling chain liberated therefrom. A separate hook is employed  
for each coupling chain. “ To disconnect the central coupling  
“ the driver checks or stops his engine and presses it up against  
“ the train, or allows the train to press up against it, until the  
“ stirrup is pushed sufficiently back into the hook to enable it to  
“ be raised out of and free from the hook ; the driver then raises  
“ it out of the hook, and the disconnection is effected.”

[Printed, &c. No Drawings.]

A.D. 1861, September 11.—N<sup>o</sup> 2261.

BOWNS, JOHN.—“ Improvements in railway wheels and railway  
“ brakes.”

According to one part of this invention a railway wheel is  
provided with a tyre which is furnished as usual with a guiding  
flange on the exterior, there being on the inside of the tyre a  
“ dovetail projection.” “ The spokes of the wheel are composed  
“ of two discs or rings of wrought iron or steel, one being on one  
“ side of the wheel, and the other on the other side. The rings

“ are divided radially into segments, and the central portion of  
“ each segment is cut away to lighten the wheel. The longer or  
“ outer circumference of each of the segments is turned up at an  
“ angle to fit into the dovetailed projection on the inside of the  
“ tyre,” and the “ smaller or inner circumference of each of the  
“ segments of rings is also turned up to fit in recesses on each  
“ side of the boss, and the segments are connected to the boss by  
“ means of rivets or bolts passing through the boss and through  
“ the segments. The outer edges of the segments on the opposite  
“ sides of the wheel are drawn towards each other by bolts and  
“ nuts, and are thus caused to nip the dovetailed projection on  
“ the inside of the tyre. On each side of the wheel a ring of  
“ metal is placed, between the heads of the bolts and nuts and  
“ the segments. These rings are also divided radially into two  
“ or more parts, and the faces of the rings which are against the  
“ segments are made to fit to them. The diameter of the rings,  
“ which act as spokes, is a little less than the inner diameter  
“ of the tyre, so that the tyre can expand or contract freely.”

These arrangements may be varied by forming the inner face of the tyre with a dovetail recess, the outer circumference of the segments which act as spokes entering such recess, and in order to apply tyres to wheels formed in the ordinary way the outer rim of the wheel, as also the inner face of the tyre, are both furnished with a dovetail projection, the two being united by bolts and rings.

According to that part of the invention which relates to railway brakes “ the wooden blocks, which are to be pressed against the  
“ wheel, are each supported at their centre by a rod or pin supported by means of links from the framing of the carriages.  
“ Each rod passes across the carriage, and serves to support two  
“ wooden blocks, one on each side of the carriage, and the rods  
“ thus serve to keep the blocks at an equal distance from each  
“ other. The blocks are capable of turning on the rods, so that  
“ when one face of the block is worn away the block may be  
“ turned round, and another face of the block be turned towards  
“ the wheel. The rods which support the wooden blocks are  
“ connected by means of rods or links with the shorter arms of  
“ the brake lever, and when the rods are pressed by the brake  
“ lever towards the wheel, the blocks being able to turn on the  
“ rods or pins adapt themselves to the wheel whether the carriage  
“ is heavily laden or not, which is not the case when the wooden

" blocks are supported and actuated in the ordinary manner." In applying this part of the invention to wagons and trucks the blocks are mounted upon pins, on which they are capable of turning.

[Printed, 10d. Drawings.]

A.D. 1861, September 14.—N<sup>o</sup> 2297.

NEWTON, WILLIAM EDWARD.—(*A communication from William Goode Caporn.*)—(*Provisional protection only.*)—" Improved apparatus to be adapted to carriages, for the purpose of checking or arresting their progress on inclines or when going down hill."

This invention is applicable "to railroad carriages, or to carriages or vehicles intended to run either on common roads or tramways."

In applying the invention to railway vehicles, "in which the running wheels are usually keyed fast to the axle," a strong ratchet barrel is fixed upon each axle, with which a pawl or pawls may conveniently be brought to engage, such pawl or pawls being so arranged as to be kept out of contact with the ratchet until required to act, and to be dropped into contact therewith when it is requisite to check the progress of the carriage, the result being that the axles and wheels are prevented from rotating, and the latter caused to slide along the rails, creating such an amount of friction as to speedily bring the carriage to a stand. The axles of all the carriages or waggons of a railway train may be provided with similar apparatus, two ratchet barrels, however, being by preference placed upon such axle, the teeth of one pointing in the opposite direction to those of the other, and each being provided with its own pawls, by which means the apparatus may be brought into action "whichever end of the carriage may be advancing." The pawls may be either under the command of the guard or some other attendant of the train, or they may be so combined with the traction apparatus of the train as to be raised from the ratchet when the train is being drawn forward in the ordinary manner, and allowed to fall into gear with the latter upon the speed of the engine being slackened, or the train stopped.

In applying the invention to a carriage for common roads, in which the axles do not rotate, "the ratchet barrels must be adapted to the naves of the wheels." And the pawls may be

so employed as not only to check the progress of such carriage in going down hill, but also to lock the wheels of the carriage when standing still, and "effectually prevent the horses from running away."

[Printed, 4d. No Drawings.]

A.D. 1861, September 20.—N<sup>o</sup> 2357.

**CREAMER, WILLIAM GODLEY.**—"Improvements in railway brakes, & in apparatus for actuating the same."

This invention relates in the first place "to the application of a reserve power to railway brakes produced by a spring composed of an alloy of metals, consisting of about fifty parts of zinc, thirty parts of copper, five parts of tin, and fifteen parts of antimony," this combination of metals being "melted together and rolled into a suitable form for the spring required. This spring is coiled up in a box placed in connection with the shaft on which the chain or medium is wound by means of a pointed pawl," such pawl and its accompanying ratchet being disposed at or near the roof of the carriage, and a hand lever being applied to the pawl whereby it can be readily thrown out of gear with the ratchet when requisite. The pawl is jointed between the point and the fulcrum, and so arranged that when extended it will transmit a thrust and remain rigid, folding up when the hand lever is applied thereto, and so leaving the ratchet. The spring being thus uncoiled may be subsequently wound up and placed in a state of tension while the attendant is at leisure. "One of such spring reserve brake powers is applied to each carriage," the chain by means of which it operates being attached to a brake lever of suitable form.

Another part of the invention relates to an arrangement of parts by which the guard and engine driver of a train may communicate with each other, this being effected "by means of a rope carried throughout the train," which rope has attached to it the detent pawls of the springs constituting the reserve brake powers, these pawls being connected to the rope through the medium of short cords passing over pulleys, the arrangement being such that the rope may be used as a means of signalling between the guard and driver without producing any effect upon the brake powers; the latter being brought into action in case of an emergency by pulling "hard" at the rope.

[Printed, 10d. Drawing.]



A.D. 1861, September 21.—N° 2365.

STABLEFORD, WILLIAM.—“Improvements in the manufacture of wheels, and in securing tyres on or to wheels.”

This invention is intended to apply chiefly to railway wheels, but may also be applied for common road purposes. The nave has connected to it a metal disc, or series of segments or spokes, bent down at the outer edge so as to form a hook, which may either be continuous or occupy certain parts of the circumference only. The tyre is furnished with an inner web, this likewise being formed either all round or at intervals only into a hook. The hooked parts of the disc or segments and of the web of the tyre are then put together so as to “interlock and form a tight connection” between the two, there being “by preference” wood placed with the grain proceeding radially, arranged so as to bear against shoulders on the tyre at one end and against the nave at the other, or against such nave; bearing directly against the nave it may be received in sockets free to move on such nave. This wood is placed on both sides of the disc or segments, and the whole secured together by bolts, there being by preference placed on each side of the wheel a skeleton frame and ring, the bolts passing through these rings as well as through the other parts. Instead of wood, discs, segments, or spokes of metal may be used.

The patentee mentions that the wood (or if metal is used metal, instead of wood) should be so arranged on each side of the internal disc segments or spokes as to form “an angle between the tyre and the nave,” this arrangement affording the means of tightening the tyre when necessary “by causing the wooden or outer metal surfaces to approach more or less a straight line, that is, bringing them nearer together at the ends where they rest on the nave, or in the sockets upon the nave.”

Different modes of carrying out the invention are described.

[Printed, 2s. 2d. Drawings.]

A.D. 1861, October 2.—N° 2454.

FOWLER, ALFRED.—(*Provisional protection only.*)—“Improvements in buffers of railway carriages.”

According to this invention, in order to prevent the buffer heads of railway carriages from rising or falling in respect to each other, tubular shields or guards are applied to the buffer heads of



one carriage into which the buffer heads of the next carriage may slide or pass freely, and thus the buffer heads of the two carriages will be prevented from assuming "different levels," either by reason of one carriage being forced violently towards the other, or of injury to the wheels or axles of one of them. "It is preferred  
 "to construct these tubular shields or guards each in two halves,  
 "and to put them together by projecting longitudinal flanges at  
 "the top and bottom, in order thus to obtain strength; but this  
 "construction may be varied, and it is preferred to apply two of  
 "these shields or guards to each railway carriage, one at each  
 "end and at the opposite angles, in order that when two carriages  
 "are coupled together the buffer head of one carriage not having  
 "a shield or guard applied thereto may enter the shield or guard  
 "of the buffer of the other carriage which has a guard or shield  
 "applied thereto."

[Printed, 4d. No Drawings.]

A.D. 1861, October 9.—N° 2517.

HASLEWOOD, EDWARD. — (*A communication from Samuel Thompson Armstrong and Jared Wilson Post.*)—(*Provisional protection not allowed.*)—"Improvements in apparatus for preventing  
 "or lessening the slip of the driving wheels of locomotive engines."

This invention relates to that description of apparatus by which it has been sought to effect a more perfect bite or adhesion of the wheels upon the rails by the application of an electric helix or coil applied at or near to the lower portion of the periphery of the wheel, so that the wheel may rotate within, but without touching the helix or coil, and become converted into an electro-magnet.

The invention "comprises the following improvements, namely,  
 "the constructing such apparatus with the helix or coil covered,  
 "in respect of the appearance it would present in elevation or  
 "side view when applied to a wheel, so that the lower portion of  
 "the curve might be disposed at or in proximity to the lowest  
 "portion of the wheel, that is to say, where the wheel and rail  
 "are in contact, whereby it is intended to obtain a maximum  
 "or an increased magnetic effect; also it comprises means of  
 "adjustment for varying the position of the helix or coil; also  
 "means of insulation of the helix or coil; also the 'laying up'  
 "or constructing the helix or coil by a continuous coil of copper  
 "or other wire from the bottom to the top, and from the top to

" the bottom, as distinguished from the hitherto method, which  
" has been to coil from the bottom to the top, then cross the end,  
" and go back to the bottom, thereby crossing the ends at every  
" layer of wire. By this arrangement is intended a great saving  
" of power, by having less resistance in the electric current, and  
" gaining additional magnetic force. The above improvements  
" to be used in any of the combinations of which they are con-  
" veniently susceptible."

[Printed, 4d. No Drawings.]

A.D. 1861, October 10.—N<sup>o</sup> 2534.

**BROWNE, BENJAMIN.**—(*A communication from Perry Green Gardiner.*)—"A new improved spring."

This invention consists of "a combination of steel blades or strips of tempered steel bent in different curves or directions, said blades being connected together at their extremities by pins, so as to act one upon the other in such a manner as that, when in use, the end portions of such said blades pressing upon each other stiffens the springs, and thus adapts them to the wad or pressure they are required to bear or carry." This improved spring may either be formed of a single blade of steel, or of several blades connected together in the usual manner; in this case, however, the two innermost or main blades connected together by their ends. "The form or shape of the bend of these plates may either be of elliptical or of other form," the patentee stating that he proposes to form the uppermost main blade "of a regular curve," but the lowermost blade of a compound curve, that is to say, he forms "the centre portion curved in one direction, and the ends curved in an opposite direction, so that when a spring thus formed is in use the ends only shall gradually press more or less against the uppermost curved blade, thus shortening the elastic parts of the two blades, or altering the effective length of the spring, and stiffening the spring in proportion to the weight or pressure thereon," the patentee stating that it is this peculiar combination of curved plates that constitutes the invention.

The invention is very clearly described, the patentee stating in particular that he claims as of his invention the "combining with an upper elastic blade of an arched or elliptic form an 'ogee' shaped under blade;" and, also, using in combination with a spring made of two blades connected at their ends, an

under blade " of such a length in relation to the upper blade  
 " that the two blades shall be prevented from coming in contact  
 " at the centre, whatever the superincumbent weight or load may  
 " be."

[Printed, 8d. Drawing.]

A.D. 1861, October 16.—N° 2571.

DIXON, JOHN, and CLAYTON, ROBERT.—" Improvements in  
 " the construction of railway wheels."

" This invention relates to " certain improved modes of securing  
 " the tyres to the felloes of railway wheels," and consists in  
 making a " dovetailed recess at one side of the tyre, fitting on a  
 " V-shaped projection on one side of the felloe," there being at  
 the other side of the tyre a groove, a corresponding groove being  
 made in the felloe, and an annular clip or cramp being inserted  
 into the two grooves, the tyre, or the felloe, being then so " ham-  
 " mered up " so as to retain the clip or cramp. Instead of an  
 annular clip or cramp " segmental clips or cramps of any con-  
 " venient length may be employed, and in this case the grooves  
 " in the tyre and felloe may be square in those parts into which  
 " the clips or cramps enter, and dovetailed in the intermediate  
 " parts which are hammered up to retain them in their places, or  
 " the segmental clips or cramps may fit into square grooves in  
 " the tyre and felloe, and be secured therein by hammering up on  
 " to the dovetailed parts, or the clip or cramp may fit in the  
 " groove in the tyre and under the rim of the felloe."

The details of the invention may be variously modified.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, October 25.—N° 2668.

WHARTON, WILLIAM.—" Improvements in the manufacture  
 " or construction of springs for railway or other vehicles."

The object of this invention " is to produce springs, which,  
 " while capable of the same resisting or supporting power shall  
 " be (considering the weight or traction) much lighter and more  
 " secure than those hitherto in use as buffing, bearing, or other  
 " description of springs." In carrying out the invention the  
 patentee first takes " a bed plate of suitable material of the full  
 " length of the spring required, its ends being turned into a  
 " solid or rolled eye or loop suitable for the ordinary attachments,"

a second plate being then made to overlap or turn downwards so to enclose the edges of the bed or bottom plate, and upwards to receive the edges of the upper or third plate, "forming a T edge" on both sides of the plate. All the additional plates used in "making this spring are fitted consecutively, as just explained, "or in the same manner," and "the length of each of the plates used in making the spring is governed by the ordinary "calculations."

The invention is described in detail under a great variety of modifications, adapted chiefly for the buffer and bearing springs of railway vehicles, the patentee defining his invention as consisting more particularly in "a combination of spring plates "secured together or embedded with each other by the peculiar "form or forms of the edges thereof, such plates not being "dependent on slots and pins or studs to secure them in position "laterally."

[Printed, 10d. Drawing.]

A.D. 1861, October 25.—N° 2680.

LA MOTHE, BERNARD JOACHIM.—"Improvements in the "construction of metallic railroad cars and other vehicles."

This invention consists in the employment of metallic bands and tubes for forming the ribs or framework of railroad cars, carriages, or other vehicles, whereby great strength and lightness are obtained, the cost of construction being also lessened in consequence of the facility with which the parts may be attached together, this being effected by binding the parts together without employing rivets or bolts or perforating such parts, and so weakening the latter. Different modes of carrying out the invention are set forth, in some cases longitudinal pipes being combined with vertical ribs, such pipes and ribs being connected by means of "clasps," which may be attached either in a hot or a cold state. Instead of pipes, flat bands of metal may in some cases be used, and in cars for railroad purposes suitable arrangements are provided for attaching thereto coupling and buffing apparatus of the usual character. Where clasps cannot be conveniently used plates may be employed, such plates being connected by rivets. The doors of the car are composed of a framework of bent pipes connected to ribs by means of bands, and the panelling of the doors as well as of the sides of the vehicle is composed of sheet



metal, "made more or less ornamental by ribs, panels, or other  
 " devices pressed in the same, which increase the beauty and tend  
 " to keep the sheet metal straight and stiff." The windows may  
 be formed in any convenient manner, but the patentee prefers to  
 use "a metal frame surrounding the glass, and sliding on a metal  
 " rib connected to the sides of the tubes forming the transverse  
 " ribs" of the vehicle. The inside of the car may be floored  
 and fitted up in accordance with the use to which the car is to be  
 applied, and may be divided into suitable compartments, a  
 passage if needful extending from one end of the vehicle to the  
 other, the roof over this passage being raised in such manner as  
 to leave a space either for ventilation or the introduction of light.  
 "For freight cars a lining of wood should be employed to take  
 " any wear," and passenger cars are each provided with a water-  
 closet for the convenience of travellers.

[Printed, 10d. Drawing.]

A.D. 1861, October 26.—N<sup>o</sup> 2687.

WRIGLEY, FRANCIS.—(*Provisional protection only.*)—"Im-  
 "provements in the construction of railway wheels and wheel  
 "tyres."

This invention has for its object the securing of tyres upon  
 railway wheels without the use of bolts or rivets passing through  
 such tyres, "and so that if the tyre should break, the fractured  
 "part or parts will be prevented from flying off from the wheel  
 "when in motion."

In the formation of new wheels the tyre "is made with two  
 "undercut 'recesses,' one on each edge of its inner periphery,  
 "forming a 'dovetail,' and the rim or sole plate of the wheel  
 "has a flange formed on one side, which is undercut to corre-  
 "spond to the dovetail on one side of the tyre, and an annular  
 "ring is provided for the other side, which is shaped to fit the  
 "undercut recess in the tyre, and also to take hold of the under  
 "side of the rim or sole plate. When the tyre is placed on the  
 "wheel the annular ring is then put on, and secured by rivets  
 "or bolts passing through it and the rim or sole plate of the  
 "wheel breadthwise."

In applying the invention to wheels "already made, of the  
 "ordinary construction, the old rim or sole plate of the wheel is  
 "slightly undercut on its two edges, so as to form a 'dovetail'

"in cross section," a "false or extra rim or sole plate" being then prepared similar to the rim or sole plate of a new wheel such as mentioned above, but having a flange on one edge of its inner periphery, this false rim or sole plate being shrunk upon the prepared rim of the old wheel, so as to grasp the dovetail formed thereon, and the tyre being then secured to the false rim or sole plate as in the case of a new wheel.

According to another mode of carrying out the invention, which is applicable to both new and old wheels, the outside edge of the tyre has a flange formed on its inner periphery, which is undercut, the inside edge being also undercut or recessed, and the outside edge of the rim or sole plate being bevelled to correspond with the undercut part of the flange on the tyre, while the other edge of the rim or sole plate is left square. When the tyre is placed on the rim or sole plate it is secured by an annular ring similar to that mentioned above, which is so shaped as to take hold both of the under side of the rim or sole plate and the recessed edge of the tyre, the ring being fastened by bolts which pass through it, through the rim or sole plate, and through the flange on the inner periphery of the tyre.

[Printed, 4d. No Drawings.]

A.D. 1861, October 31.—N° 2734.

FANSHAWE, JOHN AMERICUS, and JAQUES, JAMES ARCHIBALD.—(*Provisional protection only.*)—"Improvements in the means of securing the doors of railway carriages."

The object of this invention is to prevent the doors of railway carriages from being opened while the train is in motion, and yet allow them to be opened when the carriages stop, which object is effected by self-acting machinery placed beneath each carriage "and set in motion by the running wheels." When a train is in motion the doors of the carriages are secured by bolts, which are pushed forward from some convenient part of the framing into sockets made in such doors; these bolts being connected by means of rods to a vibrating lever or shaft, the latter being itself connected by a lever and rod to the machinery below the carriage. The inventors state that the most convenient mode of operating upon the bolts "is by connecting the locking bolt levers to the piston of a small cylinder which is kept constantly filled with oil, water, or air, by means of another and larger pump. This



large pump is worked by means of an excentric on one of the running axles of the carriage, "and as this larger pump will " always keep the small cylinder full the piston and the latter " will be kept constantly at the end of the cylinder, and conse- " quently will keep the locking bolts pushed forward into their " sockets in the doors, so that these latter cannot be opened so " long as the large pump is kept in action, but immediately " this stops a strong spring, which acts on the vibrating lever or " shaft, will force back the piston in the small cylinder, and " draw back the locking bolts, and thus leave the doors free to " be opened."

" In order to enable the doors to be shut, should any be left " open accidentally when the train has started into motion, the " ends of the bolts may be bevilled off like the spring bolts of " any ordinary door."

[Printed, 4d. No Drawings.]

A.D. 1861, November 2.—N<sup>o</sup> 2760.

LOCKIE, THOMAS.—"Improvements in the manufacture of " wrought iron wheels."

This invention " relates more particularly to the uniting of the " inner ends or heads of the spokes of wrought iron wheels, and " the forming of the boss, and in practising the same."

According to one modification of the invention the inner ends of the spokes "are shaped of the usual segmental form in " face view," but they are constructed "of the full depth of the " boss" of the wheel, and the middle portion of each is, "as it " were, removed, so as to impart a fork-shape in side view." The parts being thus arranged "are hooped together and sub- " mitted to a single welding heat," which is sufficient to cause the spokes to be united to each other, the hoop or central ring being by preference formed with a recess or hollow on one or both faces, and the boss "being compressed between dies when " at the welding heat," and the corresponding parts of the spoke heads being forced into the hollow, the parts being "thereby " firmly locked together." "The dies are shaped to fit upon and " enclose one the upper half and the other the under half of the " boss, and an eye is formed through the centre of each to permit " of a barrel-shaped pin or mandril being forced through the eye or centre of the boss," whereby the hoop or central ring is

firmly united to the rest of the fabric. The details of the invention may be varied.

[Printed, 8d. Drawing.]

A.D. 1861, November 14.—N° 2873.

LEOPARD, WILLIAM.—(*Provisional protection only.*)—"Improvements in railway brake apparatus."

This invention is "based upon the principle" of that described in a former Provisional Specification of the present inventor, dated the 7th of June, 1861, and numbered 1450. In that invention "the power applied to the brakes is derived from the rotating motion of the wheels and axles of the carriage, the guard or other attendant simply putting them in or out of gear as may be required."

The present improvements are set forth at very great length, but consist essentially in the first place in the use of a peculiar coupling for connecting the longitudinal shaft employed to work the brakes of one carriage with that of another, each coupling consisting of a central disc or block carrying joints in which are fitted two arms furnished with springs, which arms can either be folded down so as to project towards the next carriage, or moved upwards out of the way, two carriages being connected by folding down the arms of their respective couplings, and causing them to engage with certain notches formed in the central discs or blocks. Another part of this invention consists in the use of a cam placed on the longitudinal shaft, and capable of raising or lowering one end of a short shaft on which is a screw wheel or pinion, the latter, by the lowering of the short shaft, being brought into gear with an endless screw on the carriage axle, and the shaft then rotating, and, through the medium of suitable toothed gearing and a double elliptical cam, pressing the brakes against the carriage wheels. The brakes are fitted and sustained between tie bars arranged between the axle guards, and mounted on sliding cross bars which are acted upon by the double elliptical cam mentioned above, there being springs so arranged in connection with the cross bars and brakes as to cause the latter to act gradually upon the wheels when applied thereto, and to withdraw them therefrom when the action of the cam upon the cross bars ceases. Screws and nuts, and certain curved arms, are also so contrived as to furnish the means of adjusting the brake blocks as they become

worn, and on the short shaft mentioned above is a ratchet wheel, in gear with which is a pawl, the effect of this being that when the brakes have been sufficiently applied to the wheels, that shaft may be thrown out of gear with the endless screw on the axle, but will be prevented from turning backwards, and the action of the brakes thereby being caused to cease, until the pawl is released from the ratchet. The "screw hand wheel shaft" used to actuate the "shaft of communication," or longitudinal shaft, is held abreast of the screw on the latter by a spring, "which may be overcome by any superior force, and thus ease the gear," thus preventing injury to the latter on too much force being applied to the hand wheel.

Different modifications of these arrangements may be made. Thus instead of the double elliptical cam a double armed lever actuated by a toothed segment and endless screw may be used, the lever acting upon the brakes through the medium of connecting rods and springs, the sliding bars being in this case either used or dispensed with, as may be preferred. The details of the invention, including various arrangements of ratchet and other wheels, toothed segments, endless screws, and other mechanism. A mode of preventing injury to the brake mechanism is also mentioned as consisting in the application of the brakes to the wheels through the medium of a toothed segment of limited dimensions, and a pinion which can only move the segment to a distance according with such dimensions.

[Printed, 4d. No Drawings.]

A.D. 1861, November 15.—N<sup>o</sup> 2874.

MINCHIN, CHARLES HENRY.—(*Provisional protection only.*)  
—"Improvements in ventilators for railway and other carriages,  
"and for other similar purposes."

At the top of the aperture for the window sash, and behind the grooves in which the sash slides the inventor places certain strips of wire or silk gauze "jointed together so that they can be folded  
"or opened out, the top strip being held by pivots working in  
"bearings fixed to the frames. The bottom strip of gauze is  
"mounted with a bevelled strip of wood or other material, to  
"which the top of the sash is made to correspond, and the strips  
"are made to unfold or expand by means of weights or pulleys.  
"At each or either end of the lower strip, or parts connected

“ with it there is a cord or chain passing over a guide pulley, at the top, between other guide pulleys in the frame, and fastened to the lower part of the sash or to weights and rods; or levers are employed for the same purpose. When the sash is placed at its lowest position the strips of gauze are closely folded together to allow the aperture to be of the largest dimensions, but as the sash is being raised the strips gradually unfold until they meet the sash and cause the bevelled edges of the sash and bottom strip of the folds to be in contact. As the sash is still further raised it lifts the strips, closing them one after the other, by which means any amount of ventilation can be obtained.” In order to procure the required friction for the proper sliding of the sash tubing of india-rubber or other material is placed in contact with plates of metal, “ or other suitable contrivance.”

[Printed, 4s. No Drawings.]

A.D. 1861, November 22,—N<sup>o</sup> 2929.

MEYER, HERMANN CHRISTIAN.—(*Provisional protection only.*)  
—“ Improvements in the means of stopping or retarding railway  
“ and other carriages.”

The inventor says, in the first place, “ I use the weight of the carriages or their motive power as break power; to which end I shift or turn the axles or bearings, and use eccentric axles or eccentric bearings, or lower or raise the bearings by any other motion, or reverse the eccentric axles or eccentric bearings generally, thus forcing the wheels towards a break fixed on the body of a carriage; or I lower the body of carriage (with fixed stay and breaks) on to the rails or roadway. The bearings for railway carriages should be eccentric, and each have a moveable stopper or pall, so as to prevent them from turning.”

Each stopper or pall is raised by means of a lever or other suitable mechanism, “ the levers to be connected by connecting rods and chain couplings to friction gear on the driving axle of the locomotive or engine (the friction gear to be double acting for both the forwards and backwards motion of the engine); the friction gear to have a hand lever within reach of the driver or person in charge of the break; when the hand lever is moved it will act so as to wind up a chain connected to the levers, and so liberate the eccentric bearings, when the latter

" will make a partial turn, and so lower the breaks, which are  
 " fixed under the frame of the carriage but above the wheels, on  
 " to the wheels; or the breaks may be fixed before or behind the  
 " wheels (as stays), of such length that they will reach to a short  
 " distance of the rails, and, in this case, by liberating the bear-  
 " ings, which will turn by the weight of the carriage," the latter  
 " will sink on to the rails or road, and the wheels will then clear  
 " the rails or road, the eccentric bearing being made to give a  
 " greater throw than the distance of the said stays from the  
 " rails or road." In order to set the train in motion again,  
 " there is fixed on the eccentric bearings a lever, connected by  
 " connecting rods and coupling chains to a second double-acting  
 " friction gear drum, with hand lever within reach of the driver  
 " or person in charge of the break, by moving which lever the  
 " drum will revolve and wind up the loose chain, and so with the  
 " power of the engine, or animal power, turn all the eccentric  
 " bearings into their proper positions. The moveable stopper  
 " drops, and the carriages will proceed.

In common road carriages " the application of the eccentric  
 " bearing or eccentric axles will cause the axle itself to make a  
 " partial turn when break power is to be applied, although the  
 " axle will as usual remain fixed when the carriage is in progress."

The inventor states that " various motions may be applied,  
 " which will have the same effect as eccentric bearings or eccentric  
 " axles."

[Printed, 4d. No Drawings.]

A.D. 1861, November 22.—N<sup>o</sup> 2937.

BARTHOLOMEW, CHARLES, and HEPTINSTALL, JOHN.—  
 (*Provisional protection only.*)—" Improvements in making circular  
 " blooms, such as are used in the manufacture of tyres and for  
 " other purposes."

According to this invention a puddled bar of iron is cut into  
 segments or radial pieces, " the cuts being made to slope alter-  
 " nately in either direction," and in such manner that the pieces  
 when laid together will form a " complete polygonal ring." A  
 number of these segments are then placed together so as to form  
 a pile, being laid in circles, one upon another, so that the pieces  
 of one circle " break joint" with those next to it, and a " flat  
 " coil" being placed at the top, and another at the bottom of



the pile. This pile is then heated and welded into a solid mass in a suitable die, a punch of wrought iron being afterwards used to form the inner surface of the bloom, "and to consolidate the iron laterally, and the whole is sufficiently hammered for thorough consolidation." A bloom may thus be formed from cast or blistered steel instead of iron, or of steel and iron combined in such manner that the outer portion of the bloom, or that next the circumference, shall be wholly of steel, and the inner portion wholly of iron. And this part of the invention may further be varied by using top and bottom coils of steel, with radial pieces of iron between the two, the pile being afterwards completed by enclosing it in a spiral coil of steel, a bloom being thus obtained "having a thin coating of steel, both externally and top and bottom." These blooms may all be rolled in the mode for which a Patent was granted to the present inventors on the 14th of May, 1857.

[Printed, 4d. No Drawings.]

A.D. 1861, November 28.—N° 3000.

ROWAN, JOHN MARTIN.—"Improvements in the manufacture of railway wheels, and in apparatus to be used therein."

This invention "relates to the class of railway wheel of which the spokes and inner frame or rim are composed of bars formed into open triangles or sectors, and has for object generally to improve, simplify, and cheapen the manufacture."

The first branch of the invention relates to fixing the tyre on the spokes, "these being such that the tyre may be rolled in its circular form." This part of the invention embraces the employment of various modifications of the system of uniting tyres with spokes by dovetailing, "dovetail keys" being in some cases used, and in other cases keys with "duplex dovetails," while in other cases the arrangements are such that no keys are required.

Another branch of the invention consists in forming the boss of the wheel of cast steel, or of a mixture of cast steel and cast iron. "The boss is cut in the usual way so as to embed the inner ends of the spokes," "but in the case of cast steel it is requisite to apply pressure to the boss when in a heated state."

A third branch of the invention relates to bending spoke bars into a triangular form, and consists in the employment of a



machine in which a slide which is worked upwards and downwards by a screw and certain apparatus connected therewith carries not only the bar which is to be bent, but also certain die pieces, which on the descent of the slide are made to act upon the bar, and are released therefrom upon the ascent of the slide, various guiding and other rollers, toothed wheels, and other mechanism being employed in carrying out this part of the invention, one part of the arrangement causing the projecting parts at the corners of the spoke bar to be forced upwards, in order to provide for the subsequent welding of the spokes together. This welding is effected by the use of another machine in which rolls are made to act upon the projecting parts of the spoke bar mentioned above, and the patentee states that the spoke rims of wheels formed and united in the ordinary way may be rendered truly circular "by being heated and subjected to the same machine." The details of this machine, as well as of that previously mentioned, are of somewhat complex character, and will not be clearly understood without an examination of the Drawings annexed to the Specification. Each machine is driven by means of a small steam cylinder, with piston and crank, attached to the machine, this rendering the machine "self contained."

[Printed, 1s. 4d. Drawings.]

A.D. 1861, November 29.—N<sup>o</sup> 3014.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from Richard Dover Chatterton.*)—(*Provisional protection only.*)—

"An improved safety buffer or apparatus to be used in railway trains to prevent accidents from collisions."

This invention consists of an air-tight cylinder, or air-tight cylinders, suitably fitted and mounted upon a truck or carriage, so as to form "a compressed air buffer." It is proposed that "two trucks carrying the buffers should form part of every train, one in front and the other at the rear of the ordinary carriages, but more or less than two such trucks may be used. The cylinders are fitted with two pistons, the rods or trunks of which extend beyond the cylinders at each end, and carry buffer heads," being provided with a safety valve or safety valves "to prevent explosion, and also to allow of the escape of compressed air after a given pressure has been attained, in order to

" prevent the rebound or forcing back of the pistons, or either of " them." The cylinders may be provided with rails, and the pistons be furnished with grooved wheels or pulleys to run upon such rails, and the piston rods may work upon friction rollers.

[Printed, 4d. No Drawings.]

A.D. 1861, December 12.—N<sup>o</sup> 3117.

LONGRIDGE, WILLIAM SMITH.—" Improvements in railway " wheels and tyres."

According to this invention there is formed upon the inner periphery of the rim of a railway wheel a rim or flange, " either " continuous around the wheel, or by lugs at intervals," and it is to this continuous flange, or the lugs, as the case may be, that the tyre is secured by bolts, rivets, or other means, the tyre having a flange projecting from its inner periphery, or lugs corresponding with those on the rim when the latter is furnished with lugs, the bolts, rivets, or other fastenings " passing through " the flanges or lugs upon both the rim and the tyre." When repairing the rims of old or used wheels for " re-tyring," the patentee welds or otherwise securely fits to the inner peripheries of the rims " pieces to form the continuous flanges or lugs at " intervals, and to which the corresponding flanges or lugs upon " the tyres are secured, as before described;" and he states that sometimes, " instead of forming or making the continuous flanges " or lugs at intervals, upon the rims proper of the wheels or " skeletons," he uses such wheels or skeletons " as of the usual " construction, plain, or without any flanges or lugs upon them," and then fits upon these rims or skeletons, by rivets, bolts, or other convenient means, old tyres, or other tyres " provided with " the continuous flanges or lugs " upon their inner peripheries, these being then turned and prepared for the reception of the " tyres proper," which are provided with continuous flanges or lugs, " and are secured and fastened as before described."

The invention also relates to the " piling of blooms or combining the materials for the manufacture of tyres of railway " wheels " when steel and iron are used in combination, the arrangement being such " that the two materials interlock or " dovetail with each other," and the result being that in the finished tyre there is " a great amount or thickness of steel at " about the middle of the tyre, or where the greater amount of

“ wear and tear occurs, and a lesser amount or thickness at the edges or sides of the tyre.”

[Printed, 8d. Drawing.]

A.D. 1861, December 14.—N° 3149.

JOHNSON, JOHN HENRY.—(*A communication from Thomas Jefferson Thompson.*)—(*Provisional protection only.*)—“ Improve-  
ments in railway rolling stock.”

According to this invention the passage of railway trains “ over sharp curves ” is greatly facilitated, and the wear and tear of the rails and wheel tyres thereby considerably reduced. It is proposed to fit one of the wheels of each axle of a railway vehicle upon the axle in a peculiar manner, so as to admit of its rotating freely thereon, the opposite wheel being fast upon the axle in the ordinary manner. “ The boss of the loose wheel is prolonged and extended considerably towards the longitudinal centre of the axle, and this long boss is bored out conically, or tapering at each extremity, in which parts are fitted correspondingly tapered or conical metal bushes, made in two or more segments, which are connected together by having a projection or tongue formed on one segment fitting into a corresponding slot or opening in the other, so that one segment cannot be moved longitudinally along the axle without drawing others with it. These conical bushes are tightened up by means of bolts,” one end of each of which “ bears upon the inner ends of the bushes, whilst the other passes out through the boss at the outer side of the wheel, when a nut is applied,” and the wheel “ is maintained upon the axle by means of a ring bolted on to the inner end of the long boss, and bearing against a shoulder or collar forged or fitted on to the body of the axle. A chamber or cavity is left between the two bushes, inside the boss, for the reception of lubricating material.”

[Printed, 4d. No Drawings.]

A.D. 1861, December 21.—N° 3211.

SELBY, FRASER.—“ Improvements in boilers for the generation of steam in engines, for applying steam for motive power purposes, and in wheels and ways for steam carriages to run on.”

One part of this invention "relates to the transmission of motion from the crank axle to the driving axle, where gearing is used specially applicable to paddle wheel steamers, traction, and locomotive engines. The driving axle being much subject to vibration is made into two shafts, that is, is divided in the centre; the inner ends are hung on swivel or ball bearings, whereby the shaft is allowed to move in one direction, both up and down; the geared wheels hang over the centre of these bearings, and being geared into a pinion or wheel on the crank axle can never get out of gear or cross the teeth, one fitting into the other, the face of the wheels being convex and concave according to the radius taken from the swivel bearings, and the diameter of the wheels. The other ends of these half shafts are fixed as is usual, and kept in their places by springs." Different modifications of this part of the invention are set forth, in one case there being a ball joint or journal at the end of the axle. "The springs for the driving wheels may, if desired, be placed below the axles instead of above them, or a single spring may be used, fixed parallel with and below the driving axle, instead of at right angles thereto."

Another part of the invention "relates to the wheels of locomotive and traction engines and the tramway for them to run on. The rim of the wheel is made of an inverted V shape, with or without flat side rims, so as to run on a tramway or not," the rails being in the form of tubes of either wrought or cast iron, or of a half circle, "by which means the engine will gain more tractive power than with ordinary flat rails." Where no tramways are used a flange is fixed either on one or both sides of the wheel, of smaller diameter than the other part of the rim, so that when the engine runs over soft ground it will bear on the flanges as well as on the wheel; there being, moreover, fixed on the rim of the wheel at convenient distances apart, "plates, by preference in the form of horse-shoes, to give greater power to the forward motion of the engine, and thereby prevent slipping."

[Printed, 2s. 2d. Drawings.]

A.D. 1861, December 24.—N° 3222.

VICKERS, THOMAS EDWARD.—"Improvements in the wheels of railway engines and carriages, and in the machinery or apparatus to be used in making the same."

The first part of this invention relates to casting the wheels of railway engines and carriages of steel, "and of a disc form of a peculiar character. The nave and rim or tyre of the wheel, together with the disc which connects these parts together in place of spokes, is all cast in one piece, so that there will be no danger of the rim or tyre becoming loose or coming off," the disc, moreover, being furnished with corrugations, so combined as to cross each other, the patentees stating that this system of arranging the corrugations is superior to that in which they are formed so as to be concentric with the nave or tyre, or nearly so, as also to that in which they pass radially from the nave towards the tyre.

This wheel must be cast in a fireproof mould, that is to say, in a mould lined with fireproof material, as described in the Specification of the Patent granted to Ewald Riepe, on the 9th of July, 1853 (No. 1637). Such a mould may be made from a wooden pattern, or templates may be used to produce the nave and rim or tyre, such templates being fixed upon a horizontal arm, which is mounted on a central spindle in the middle of the moulding frame, other templates for forming the corrugations being also connected to the same horizontal arm, but so mounted in connection with levers and rods that on the whole being turned round "the fixed templates will form those parts of the mould which will produce the rim or tyre and nave, and the moveable templates will form the disc part of the wheel with the double corrugations;" the moveable templates being actuated by cams which raise and lower them alternately.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, December 24.—N° 3227.

**BIRKBECK, GEORGE HENRY.**—(*A communication from Claude Arnoux.*)—"Improvements in the arrangement of traction and connecting apparatus for railway carriages and trains."

The object of this invention is to enable railway trains to follow curves of "small radius," and the invention consists in the employment of certain diagonal bars, two of which are jointed at one end to the front axle of a carriage, while at the other ends they are jointed to the arms of a T-piece placed above the hinder axle, these bars being twice as far asunder where they are united to the front axle as where they are united to the T-piece, the axes



themselves being united by centre bolts to a longitudinal draw bar, and the T-piece having the same centre bolt as the hinder axle. The diagonal bars cross without impeding each other in their movements, and coupling bars are united to the ends of the draw bar, the hinder axle being, as in the ordinary arrangement, provided with a frame composed of bars jointed together in the form of a parallelogram, "which on one side is attached to the draw bar, and on the other to the coupling bar," the latter being united to the draw bar of the next carriage. These arrangements are applicable to all the carriages of which a train is composed, in cases in which it is desired to pass very small curves, however, the ends of the diagonal bars being united to the front axle and the T-piece through the medium of semi-circular pieces, to which the bars are united by pieces of flat chain. The details of the invention may be otherwise varied, and several advantages are mentioned as arising from the application of the invention. The latter may be applied to locomotives as well as to carriages.

[Printed, 10d. Drawings.]

A.D. 1861, December 31.—N° 3261.

MACNAIR, ANDREW.—(*A communication from Davis Dotterer.*)  
—(*Provisional protection only.*)—"Improvements in axle boxes  
"for railway carriages."

According to this invention "the journal of the axle is formed  
"and shaped in the ordinary manner, but instead of the usual  
"bearing made of brass or other metal, a strong hoop of iron, steel,  
"or other suitable metal is made; this hoop is turned or bored in  
"the inside, so that the journal exactly fits into the shape in which  
"the hoop is bored; this hoop is four or five times in its inside  
"diameter greater than the external diameter of the journal, or  
"it may be made of other proportions if desired; the hoop is  
"carried by and connected to the inside of the axle box by a metal  
"wheel of suitable size, also turned on its outside to the same  
"shape and length as the shape and length of the journal, and  
"this metal wheel revolves freely on a pin of steel, or other  
"metal of suitable strength, securely fixed into the axle box.  
"The axle box is fixed and adapted to the springs of the car-  
"riage in any known manner, and it slides freely in the 'horn  
"plates' by the grooves formed on its outside. The journal is



" kept steady in the axle box by means of guides formed on the inside end of the box, which act as guides to the axle."

(Printed, 4d. No Drawings.)

1862.

A.D. 1862, January 1.—N<sup>o</sup> 1.

ROWAN, JOHN MARTIN. — (*Provisional protection only.* — " Improvements in the manufacture of railway wheels, and in apparatus to be used therein."

This invention comprises " further modifications of the improvements " for which the present inventor obtained Provisional Protection on the 28th of November, 1861 (No. 3884), and it consists " in forming a dovetail groove on each side of the rim of the spoke frame, the groove on one side fitting a dovetail rim projecting inwardly from the outer edge face of the tire, whilst a dovetail groove is formed round the inside cylindrical face of the tire near the inner edge face, and in this groove there are inserted a series of segmental keys, which are formed with duplex dovetails, so as to be held firmly in the tire groove, and to clip and hold the spoke rim by locking in the dovetail groove formed upon it. To admit the segmental keys the part of the tire forming the outer side of the groove is cut away at intervals, and the keys are introduced at the cut-away parts, and forced round under the uncut parts. This improved mode of fixing the tire is applicable in renewing the tires of old wheels as well as in the manufacture of entirely new wheels."

In order to facilitate the manufacture of wheels on this system a machine is used for removing by cutting or punching portions of the tires, or wheel rims, or flanges, to admit of the introduction of keys or holding flanges, this machine comprising an adjustable chuck upon which such tires, rims, or flanges may be mounted, and turned round into different positions, such chuck being adjustable to suit different diameters."

(Printed, 4d. No Drawings.)

A.D. 1862, January 1.—N<sup>o</sup> 10.

BUSH, WILLIAM.—(*Provisional protection only.*)—"Improvements in omnibuses and other carriages."

One part of this invention relates to the construction of trucks and carriages in such manner that they may travel either on railways, or tramways, or on common roads. For this purpose the inventor fits "a plate or plates under the fore part of the truck or carriage, free to turn upon a pivot," and connects the front axle and wheels to such plate or plates. When the carriage is travelling upon a rail or tramway bolts are so arranged as to prevent the plate or plates from moving, but when the carriage is to run upon ordinary roads the plate or plates and "fore carriage" are free to move about the pivot, and thus allow of "the whole carriage turning." The wheels "are such as will travel upon rails or trams as well as upon common roads."

Another part of the invention consists "in constructing omnibuses and other carriages with parts thereof double, so that the bottom, sides, and top may, when required, be drawn out, and afford increased accommodation." An ordinary omnibus, built to hold twelve persons inside, may thus be rendered capable of containing twenty persons. The fore part of the vehicle "is immovable, but all that part commencing just in front of the hind wheels, together with the hind wheels and axle, are capable of being drawn, say, six feet from the fixed part, the space being occupied by duplicate parts, over which the parts of the carriage drawn out have been made to slide." These arrangements apply also to "vans and other long-bodied carriages."

[Printed, &c. No Drawings.]

A.D. 1862, January 1.—N<sup>o</sup> 12.

BANFIELD, EDWARD.—(*Provisional protection only.*)—"Improvements in lubricating and maintaining in working order axle journals and brasses, applicable also to other journals and bearings."

This invention consists "in employing hay, straw, grass, hemp, or hair (manufactured or unmanufactured), or the shavings or chips of wood, which are filled into or packed in the axle-box or reservoir containing the oil or lubricating fluid employed for the purpose of lubricating and maintaining in working order,

" by means of capillary attraction, the working surfaces of journals  
" and bearings."

[Printed, 4d. No Drawings.]

A.D. 1862, January 4.—N° 33.

LEYSHON, GEORGE, and BECKLEY, DAVID. — (*Provisional protection only.*) — " An improvement or improvements in breaks  
" for retarding and stopping carriages on railways."

The inventors here fix upon one or both of the axles of a railway carriage a disc or break wheel, there being over such wheel or wheels a longitudinal shaft. Around each break wheel is a clip, or nearly circular band of iron, and on the shaft immediately above the wheel is a screw which engages with a nut connected to one end of the clip, the other end of the latter being connected to another nut through a hole in which the shaft passes, but which is not capable of moving on such shaft, the arrangement being such that on causing the shaft to rotate in one direction the screw therein so moves the nut with which it engages as to tighten the clip upon the break wheel, while on turning the shaft in the contrary direction it is released therefrom. The shaft may be turned by means of a winch and suitable gearing, and the longitudinal shaft of one carriage of a train may be connected to that of another by any of the means usually adopted for like purposes.

" Instead of tightening the clip by making the screw act at one  
" end only, a screw may be employed one half of which is right-  
" handed and the other half left-handed," such screws being made to give motion simultaneously and in opposite directions to the two ends of the clip.

The invention may be applied to trucks and tenders as well as carriages.

[Printed, 4d. No Drawings.]

A.D. 1862, January 7.—N° 44.

SHAW, FREDERICK.—" Improvements in apparatus for stopping  
" railway trains."

This invention " contemplates an arrangement whereby all the  
" carriages or waggons composing a train may be furnished with  
" independent break power," and in order to effect this the  
patentee proposes " to apply breaks to all the wheels of a four-

“ wheel carriage, and to the four outer wheels of a carriage  
 “ having six wheels, the breaks to be so connected with the  
 “ buffer rods by means of spring levers that by pressure upon  
 “ the buffers the breaks are applied to the periphery of the  
 “ wheels; thus when a train is in motion, and it is necessary to  
 “ stop suddenly, the engine driver applies to the engine and  
 “ tender all the break power he has under his control, when the  
 “ impetus acquired by the train forces the carriages forward upon  
 “ the engine, which motion presses the buffers in upon the spring  
 “ levers, and the levers apply the breaks to the wheels with such  
 “ force as to stop them revolving, and the train is brought almost  
 “ instantly to a stand. When it is required to bring the train  
 “ gradually and gently to a stand, as in nearing a station, the  
 “ engine driver applies but a moderate degree of pressure upon  
 “ the engine breaks, which communicates itself equally by means  
 “ of the buffers to all the wheels of the train, and thus the train  
 “ is brought gradually up without the wheels being skidded.”

The details of the invention are very fully set forth, and include the application of a longitudinal rod below the body of each carriage, by partially turning which certain pieces of metal are brought into such a position as to “lock” the spring levers, and so prevent the breaks from acting upon the wheels when it is desired to back the train, the longitudinal rod of one carriage being connected with that of another by suitable means, so that the whole may be moved simultaneously by means of a lever applied to one of them.

[Printed 8d. Drawing.]

A.D. 1862, January 10.—N<sup>o</sup> 73. (\* \*)

WIGZELL, MONTAGUE.—“ An improved double-acting ventilator for railway carriages and other carriages and compartments.”

“ My invention relates principally to ventilating railway carriages, rooms, vessels, and other compartments to which it may be applied. It consists of two chambers, with or without inner shutters of wirework or perforated divisions for directing or dispersing the air, and for preventing the rain from entering the carriage or compartment, and it has an external opening in each chamber, so that the fresh air is admitted through one external opening into the inner space or spaces in the apparatus, and

" then into the carriage room or other compartment to which it  
 " may be applied, and the hot or impure air is made to pass out  
 " from the carriage or other compartment through the other  
 " chamber or space in the ventilator, by being assisted in its out-  
 " ward passage by the suction caused by the ventilator or appa-  
 " ratus passing through the air, or by the air rushing past the  
 " opening through which the hot or impure air passes out from the  
 " carriage or other compartment to which the ventilator is affixed."

[Printed, 6d. Drawing.]

A.D. 1862, January 20.—N° 146.

BIRD, JOSEPH.—" An improved crank axle, applicable to cranks  
 " of any description whatsoever, wherein the wear is mainly on  
 " one side thereof."

This invention consists " in forging the axles between each pair  
 " of collars, where collars are used, and where collars are not  
 " used at each extremity of the axle, of an oval form on the side  
 " where the wear will mainly be, and of a semicircular form on  
 " the other half thereof. Each collar has a recess forged or  
 " otherwise formed in it to receive the snugs which are cast on  
 " the ends, and which form part of a piece of iron or other metal,  
 " which is shaped in such wise that when one of such castings is  
 " laid on the axles formed as above described the said casting will  
 " form the axle round, the casting being secured to the axle by  
 " a screw passed through the snugs, and into the axle outside  
 " the collars where collars are used, whereby, when the casting is  
 " worn nearly through by the pressure of the bearing upon it, it  
 " can be readily replaced by another casting."

The invention may also be applied " to axles which are fixed,  
 " having the bearings revolving, or having the bearings fixed or  
 " moveable."

The details of the invention are very clearly set forth, with the  
 aid of a Drawing annexed to the Specification.

[Printed, 6d. Drawing.]

A.D. 1862, January 24.—N° 182.

HIGGIN, JAMES. — " Improvements in machinery for retarding  
 " and stopping railway carriages."

This invention relates to improvements upon the invention for  
 which Letters Patent were granted to the present patentee on the

3rd of August, 1860, Number 1879, "and it has reference to "machinery or apparatus for retarding and stopping railway "carriages by allowing the carriages to descend and rest upon "the skids or breaks described, which slide on the rails, and are "held in a proper position by suitable projections or flanges." According to the present improvements an "eccentric or other "equivalent is used for lowering and raising the carriage, and "instead of being placed immediately above the axle box it is "placed so as to act on one end of the spring" connected with such axle box, such spring being "provided with a shoe with "antifriction rollers to reduce the friction, and, if requisite, with "clips taking over projections on the eccentric to retain the parts "in their proper relative positions. The horn plates for the "bearings require to be made long, so as to provide for the "amount of lift required," and the arrangement is such that "when the carriage is lowered to bring the skids or breaks on to "the rails the springs assume a diagonal position, and when the "carriage is raised they are horizontal, as usual, each spring "being jointed at one end to a bracket of the usual construction."

The details of the invention may be varied, in some cases the bar forming the skid or break being provided with a flange which is fixed to it, while in other cases the flange is connected to a slide which is jointed to the lower arm of a double lever, the upper arm of which, when the carriage is let down, bears upon the circumference of the wheel, this arrangement enabling that part of the slide "which is intended to act like the wheel flange" to follow the flange of the wheel "with precision through all "points, or inside any sharp curve," thus ensuring steadiness and safety in the working of the apparatus.

[Printed, 10d. Drawing.]

A.D. 1862, January 28.—N° 225.

DE RIDDER, GUSTAVE JOSEPH NICOLAS.—(*Letters Patent void for want of Final Specification.*)—"Improvements in railway "carriages for the conveyance of travellers and goods."

This invention relates, in the first place, to the frames and bodies of railway carriages and waggons. In lieu of the timber beams usually employed for the main framing, wrought iron beams of T or J or other suitable section are used, and the lon-



itudinal beams may be "curved edgewise over the axle bearings" in order to admit of running wheels of larger diameter than ordinary being adapted to such carriages or waggons. The floor of the carriage or waggon must be raised at the parts immediately above the axles, and the upper half of each wheel be enclosed in a suitable box or casing.

The second part of the invention consists in the application of an oil reservoir to the journal of the axle, in such a manner that the journal shall be always immersed in oil. This reservoir is supported by a ring at the back of the journal, which embraces a shoulder on the latter, suitable packing rings being interposed between the shoulder and the reservoir. The front part of the latter is supported by small adjustable bearings, which embrace a small supplementary journal formed on the end of the main journal, and a safety grease box is fitted above the main brasses in the oil reservoir, this box being furnished with solid grease which will melt and lubricate the journal in case the supply of oil should fail and the journal become heated. The bottom of the reservoir is provided with a vessel for the reception of refuse oil, and a glass plate is inserted into the front of the reservoir in order that the quantity of oil therein may be readily seen. "In all cases it is desirable that the level of the oil be above the top of the main journal."

[Printed, 4d. No Drawings.]

A.D. 1862, January 29.—N<sup>o</sup> 240.

NEWTON, WILLIAM EDWARD.—(*A communication from Davis Henry Dotterer.*)—"Improvements in the boxes for the journals of railroad carriage and other axles."

This invention consists, firstly, "in providing in journal boxes an endless revolving belt or ring for the purpose of sustaining the weight bearing on railroad carriage axles, and reducing the friction on the axles induced by the weight supported, and likewise for elevating the lubricating or cooling material, which may be water or other liquid, from the bottom of the journal box to the upper side of the axle journal, and, further, under certain circumstances, for the purpose of forming a spring cushion above the axle journals." In the latter case the belt is composed of a series or several series of steel rings or bands, while in other cases it is composed of a solid ring of wrought

iron, in all cases such band passing over the journal of the axle and beneath a sheave or pulley placed below such journal, and in other cases being supported by a series of friction rollers or balls interposed between the shell of the journal box and the belt or ring.

Another part of the invention consists "in the employment of " an auxiliary box for steadying the end of the journal; sidewise " and endwise, and also for lubricating the end of the journal;" and the invention likewise includes a mode of providing the journal box with a longitudinal partition, and thus dividing it into two chambers, one of which contains the material for lubricating the journal of the axle, and the other a quantity of cotton waste, through the medium of which the axis of the sheave or pulley mentioned above is lubricated, such axis consisting of a steel pin passing through a "sleeve" in the pulley or sheave, the inner part of which is "chilled so as to be durable."

[Printed, 10d. Drawing.]

A.D. 1862, January 30.—N<sup>o</sup> 252.

LAHOUSSE, ADOLPHUS.—"Improvements in the manufacture " of wheels for waggon, locomotive engines, and other vehicles " used for railway purposes."

According to one part of this invention the spokes of a wheel are composed of bars of wrought iron bent into any suitable form, the two ends of each bar being then inserted while in a heated state into recesses formed to receive them in a ring or pierced disc, which is meant to form one side of the nave or boss of the wheel, this ring or disc being of wrought iron, and also heated for the reception of the ends of the spokes. During the insertion of the latter into the ring or disc, it is sustained by the lower of a pair of suitable dies, and a second ring or disc, corresponding in form with the first, is then placed upon the ends of the spokes, and the upper die being laid upon the second disc, the two discs and the ends of the spokes are firmly welded together by the use of a steam hammer. The ends of the spoke bars are either notched or so bent as to prevent them from working loose in the nave or boss.

In forming a disc wheel, two discs of plate iron are pierced at the centre so as to admit of the introduction of a wrought iron boss, which consists of "tubular forging, tapering towards its " ends," such ends being afterwards "turned over so as to bear

" against or overlap the edges of the central hole of the discs." The outer edges of the latter are so bent over as to give them a broad periphery. This arrangement may be varied by furnishing the tubular forging intended to form the boss with a central collar, from each side of which project feathers or studs which, when the parts are put together, enter and project through openings in the discs, the ends of the tube being turned back as in the first arrangement.

A mode of securing the outer edges of the discs of disc wheels is also described, which consists in shrinking upon them a felloe, which is "rolled with a hollow inner face." This felloe, having been heated, is placed upon a bed plate on which the discs have been previously laid, and the felloe, having been properly adjusted around the discs, is closed firmly upon them by the use of a bell-mouthed die.

[Printed, 10d. Drawing.]

A.D. 1862, February 3.—N° 285.

STEVENS, CHARLES.—(*A communication from Victor Boulanger.*)—(*Provisional protection only.*)—"An improved axletree."

The chief feature of this improved axle consists in its being "in two equal parts placed end to end in the same vertical plane, both moveable and independent of each other." The inner ends of these parts are of steel, and spherical in form, and resting in a concave bracket or support which is contained in a rectangular box. The wheels are "keyed on the axle journals and furnished with a central plate on either side, both wheels and plate being easily taken off. The axle has a shoulder at the outer part of the side bearing. The lower part of the central bracket and the outer parts of the side bearings are furnished with a tolerably large opening, by means of which they may be raised or lowered by a screw. The rectangular box of the bracket is formed of three pieces of sheet iron connected by tie pieces or other suitable means, the upper plate being pierced with three apertures for the greasing."

This improved axle "may be substituted with great advantage for the revolving axles of railway carriages," as well as "for the fixed ones of ordinary vehicles, whether of light or heavy construction," the system being mentioned as producing "a most important advantage when applied to railway carriages" in the

wheels being able to revolve independently of each other, while in carriages for common roads having "wooden wheels conically shaped," the two parts of the axle may be placed at an angle with each other suitable to the form of such wheels.

[Printed, 4d. No Drawings.]

A.D. 1862, February 7.—N° 323.

LLOYD, JOHN.—(*Provisional protection only.*)—"Improvements in buffers for engines and carriages on railways."

This invention consists "in connecting each head of every pair of buffers to one end of a rod, the opposite end of which rod is attached to one end of a transverse spring, which is held at its centre in such manner as to allow of its rocking or oscillating when greater pressure is applied to one buffer head than to the other." Supposing the carriages in a train to be fitted with this improved apparatus, "the whole of the buffers will remain in contact even while travelling round curves, the additional pressure while so travelling on the inner buffers having the effect of forcing out the outer buffers, and of thus keeping both the inner and outer set to the curve in contact."

[Printed, 4d. No Drawings.]

A.D. 1862, February 8.—N° 335.

TOLHAUSEN, FREDERICK.—(*A communication from Antoine Duplay.*)—"Improvements in the manufacture of the tyres of railway wheels, and in apparatus for such purpose."

This invention relates to a novel system of applying hydraulic pressure to the rolling of wheel tyres, "and to the preparatory shipping" of tyres upon their wheels. In order to form a tyre, an iron or steel bar is first wound upon a cylinder, the bar being pressed between such cylinder and a roller actuated by hydraulic pressure, "which shapes the blank or hoop." This hoop is next hammered as usual, but a swage is used with a moveable or "universal" mandril, "by which the removing operation is greatly facilitated. And such hoop "is then rolled under an upper horizontal roller, the axis of which is acted upon by hydraulic pressure by means of a hydraulic pressing box." A machine suitable for this purpose is described, in which an upper and a lower roller are used, there being other rollers on each side of the latter. Above the upper roller is the

being furnished with plungers  
valves, by raising or lowering  
may be regulated. This hyd  
carrying out the first part of th

[Printed, 8d. Drawing.]

A.D. 1862, Februar

**McCONNELL, JAMES EDWA**  
“ breaks and in warming railwa

This invention consists in th  
engine, or tender for forcing  
horizontally between the pairs  
these cylinders are pistons, w  
action of the air or water fro  
break blocks directly to the wh  
whole train. A safety pipe is a  
top of it a safety valve is fitted  
escape of the air or water wh  
valve lever is connected with a  
the guard or engine-driver wh  
“ breaks may also be worke  
“ desired.”

[Printed, 8d. Drawing.]

A.D. 1862, Feb

**BUSH, WILLIAM.**—(Provisio

wheels connected thereto. When the carriage or truck is travelling upon a railway or tramway certain bolts are so placed as to prevent the plate or plates from moving, but when it is desired that the carriage or truck shall run upon an ordinary road the bolts are released from the plate or plates, the latter and the fore carriage being free to move about the pivot, and thus allow of the carriage turning. "The wheels are such as will travel upon rails or trams as well as upon common roads."

Another part of the invention consists in constructing the frames of trucks, omnibuses, and other carriages of angle iron, and in screwing, bolting, or rivetting to such angle iron, for forming parts of the framing, two other angle irons having timber fixed between them, to which panels and other requisite parts may be attached.

Another part of the invention consists in so forming the parts of omnibuses and other carriages that the bottom, top, and sides may when required be drawn out and afford increased accommodation." "The fore part of the carriage is immovable, but all that part commencing just in front of the hind wheels, together with the hind wheels and axle, are capable of being drawn, say, six feet from the fixed part, the space being occupied by duplicate parts, over which the parts of the carriage drawn out have been made to slide." Thus an ordinary omnibus, built to contain twelve persons, may, by this invention being applied thereto, be made to accommodate twenty persons. And the invention may be applied also to vans, and other long-bodied carriages.

[Printed, 4d. No Drawings.]

A.D. 1862, February 19.—N<sup>o</sup> 440.

ADAMS, WILLIAM BRIDGES.—"Improvements in springs, and their arrangement for moving and stationary purposes."

In one part of this invention an "abutment spring" is formed of a straight bar of iron or steel, of which the ends are curved downwards and embrace the ends of the two bent springs, these being composed of plates of tempered steel fitted together, the whole being kept in their places by pins if necessary. When a spring of this description is applied to a carriage, the straight bar, which acts as a tension bar, is bolted to the carriage frame, and the bent plates rest upon the axle box. Or instead of the tension



bar a pair of abutments may be bolted to the carriage frame. In another modification of this part of the invention the spring plates are divided in the middle, and the lower ends thereof rest against a block of metal which may be mounted upon an axle box. The number of these plates may be varied, and instead of a straight tension plate, a curved plate may be used, which "may elongate with the load," being provided with slides or scrolls and shackles. According to another arrangement a saddle of iron or steel, having the ends turned up, is placed upon the axle or axle box, and employed to sustain the ends of curved plates, which act in connection with a tension bar. Such curved plates may be hooped together to strengthen the spring, and plates tapering in width may be used for the same purpose. In one arrangement which is described, a certain block is fixed to the carriage frame "to prevent the springs from being overpowered by the load, or it may be placed in the axle box for the same purpose, the curves of the blocks where the springs touch corresponding to the increased curvature of the springs." Various other modifications of this part of the invention are described, and the invention includes certain modes of constructing railway wheels and tyres, in which compound springs composed of steel rings or hoops, or segments with caoutchouc between them, are placed between the wheel and the tyre, thus giving to such wheels a degree of elasticity; this part of the invention being also applicable to the wheels of common road carriages, as well as to the wheels of spinning mules, and to wheels for other purposes.

Modifications of the invention are also described as being applicable to the formation of keys for holding rails in chairs; to the sustaining of armour plates on the sides of vessels; and to other uses; in some cases the springs being formed of slotted tubes. Arrangements are also set forth as being applicable to shafting, "to afford compensation for irregular movement."

[Printed, 10d. Drawing.]

A.D. 1862, March 7.—N° 616.

RESTELL, RICHARD.—"Improvements in apparatuses for connecting and disconnecting carriages and engines on railways, as also signal lines between guard and driver."

This invention consists in the first place in attaching to the engine, the tender, or any carriage or wagon of a train, "a stirrup, which is hinged to a plate," also a perforated rod or wormed bar, which passes through the frame of the engine, tender, or other vehicle, "and is connected to an ordinary draw spring or not, as may be needed. Or the plate may be connected to a tightening apparatus." The stirrup "has fitted to it, and depending from it, a weighted U-shaped bar, while a double similarly shaped bar is connected by loops to the upper surface of the stirrup; this latter bar has attached to it a cord, strap, or chain, which is carried to some part within reach of the driver, guard, or attendant, and at the side of the U-shaped bar is placed a flat bar, with a sliding loop for connecting and disconnecting a signal between guard and driver; the carriage to come next to that carrying the stirrup, is fitted with an ordinary draw hook," or to one or other of certain connecting hooks arranged for the purpose.

Another part of the invention consists of "a tightening, connecting, and disconnecting coupling," which may be used either with the stirrup mentioned above or with any other connecting apparatus, this lever hook being made to operate in conjunction with a projecting plate, against which it is made to abut when the coupling is closed, through the medium of certain links, a threaded rod and nut, a handle, and other mechanism.

The invention also includes "a lever tightening coupling apparatus," which consists of a plate bolted to the frame of the carriage, and having projecting therefrom a bar furnished with teeth, another bar also projecting from the plate, and a spring shoe being likewise fixed to such plate, on which the bottom of a hook rests, this hook working in combination with a certain bolt, a sliding bar, a link, a forked lever, a slotted plate, and other apparatus, the result of the arrangement being that the coupling may not only be engaged and disengaged at pleasure, but may be adjusted in length according to circumstances.

Other parts of the invention embrace "a connecting and disconnecting apparatus formed of a spiral spring draw bolt," which is raised to release, or lowered to effect and retain the coupling. Also the formation of a looped hook at the end of each of the side chains, "and in carrying a chain, cord, or band within reach of the driver or attendant, so that, when required, by pulling on the cord the chains can be released." Signal

lines, for enabling the guard and driver to communicate with each other, are used in several of the foregoing arrangements.

[Printed, 10d. Drawing.]

A.D. 1862, March 10.—N<sup>o</sup> 639.

MASSI, CHARLES.—(*Provisional protection only.*)—"Improve-  
ments in means and apparatus for retarding and stopping  
carriages used on railways or common roads."

According to this invention the brake blocks of railway carriages are mounted in the usual manner, but to the outer end of each brake lever, or to another lever which may conveniently be made to act thereon, there is fixed a "keeper," and opposite to this is placed a horse-shoe magnet of soft iron, with a copper coil arranged thereon in the manner common to electro-magnets, a galvanic battery being so arranged in connection with this wire that by the movement of one end of the latter, the soft iron horse-shoe may be magnetized, and the "keeper" connected with the brake apparatus be drawn towards it, thus causing pressure of the brakes against the wheels of the carriage to which they belong. "It will be obvious that as one of these magnets and  
brakes may be applied to every wheel or pair of wheels of a  
carriage, and the power of the battery can act instantaneously  
on as many magnets as may be in contact with it, it will be  
perfectly practicable to apply the apparatus to every carriage of  
a railway train however long, and as instantaneously remove  
the brake when not required;" and for the purpose of "obtain-  
ing a longer pull than is usual with electro-magnets" the  
keeper may be formed in "two or more parts, one working inside  
the other, but the inventor states that he "can work the appa-  
ratus perfectly well by the means first described." No  
particular application of the invention to carriages for common  
roads is set forth.

[Printed, 4d. No Drawings.]

A.D. 1862, March 10.—N<sup>o</sup> 647.

PIRET, JEAN BAPTISTE GABRIEL MARIE FRÉDÉRIC.—"Im-  
provements in lubricating apparatus."

This invention relates to the lubrication of railway carriage  
axles as well as the shafts of machinery in general. An arrange-  
ment is described which is adapted for railway purposes, in which

the axle box is of cast iron, and formed in three parts, one being an upper part, furnished with a brass lining; another being a lower part, containing a reservoir for lubricating fluid; and the third portion of the box constituting a front plate which encloses the lubricator. The latter consists of a ring fixed upon the end of the axle journal, there being on the periphery of this ring projections, which are cupped or curved obliquely to the axis in contrary directions, in order to raise the lubricating liquid during the rotation of the journal in either direction. This ring bears upon a fixed disc which has an opening at the upper part communicating with a chamber formed in the upper portion of the axle box, the result of the arrangement being that the cupped projections raise the lubricating matter from the reservoir in the lower part of the axle box and discharge it through the opening in the fixed disc into a chamber formed in the upper part of the axle box, from whence it flows to the bearing of the axle. The front plate prevents the lubricating fluid from splashing, and an opening is provided in the upper part of the box for the supply of lubricating material, such opening being furnished with a lid. The invention also includes a grooved "coupling" which prevents friction and waste of liquid contained in the lower part of the axle box, and a covering disc or annular plate mounted upon a circular flange at the back part of the axle box, and enclosing that part of the box.

[Printed, 1s. 2d. Drawings.]

A.D, 1862, March 13.—N<sup>o</sup> 694.

THOMPSON, SAMUEL KEARSLEY, THOMPSON, ARTHUR THOMAS, and MAWSON, SAMUEL. — (*Provisional protection only.*) — "Improvements in railway apparatuses for communicating between guard and driver, and for coupling and uncoupling the carriages, parts of which apparatuses are applicable to connecting pipes and tubes."

According to one part of this invention a tube is passed through each carriage of a train, the tube of one carriage being connected to that of another by means of trumpet-mouthed tubes which are pressed into contact with each other by means of coiled or other springs, and free to recede within the tubes in the carriages for a certain distance; or such connection may be formed by means of a flexible pipe. And in order to increase the effect of

any sound which may be conveyed through the tubes by way of signal a certain valve is introduced "for the purpose of catching" the wind and of driving forward the sound made after the valve "is opened."

As regards coupling the carriages of railway trains the invention consists "of two fixed hooks and of two movable hooks. One "fixed hook and one movable hook are fitted to each carriage to "a boss placed on the end of a bar capable of being protruded "from and drawn towards the carriage," and by means of certain springs, weighted levers, and other apparatus the coupling and uncoupling of the carriages is effected.

Another coupling apparatus consists of "an adjustable anchor-headed hook connected to each of the carriages to be coupled," these anchor-headed hooks being combined with screws, weighted rods, and other apparatus, all of which are fully described.

Another coupling apparatus consists "of two hooks movable "upon a centre. One hook is connected to the end of one "coupling bar, and a corresponding hook to the other. When "the hooks come in contact, the ends play, give way, and the "hooks pass each other; springs draw them into the former position, and the hooks meeting in the contrary direction become "engaged."

[Printed, 4d. No Drawings.]

A.D. 1862, March 15.—N<sup>o</sup> 712.

CLARK, WILLIAM.—(*A communication from Augustine Irel Ambler, Roseline Nancy Ambler, and Warrick Martin.*)—"An "improved brake for railroad carriages."

This invention relates to railway brakes "of that class which "are operated by the movement of the carriages from the "running gear thereof," the object of the invention being "to "obtain a brake which will admit of being applied by a single "person to all of a series or train of carriages, the brakes of the "several carriages being simultaneously applied with an uniform "pressure, and the pressure graduated as may be required with "the greatest facility, far more so than the brake of a single "carriage arranged in the ordinary way."

The invention consists in the employment of what the patentee terms "a tumbling rod, which is placed longitudinally underneath "each carriage just above its axles, the tumbling rods of the

“ several carriages comprising a train being connected together  
“ and so arranged that they with their draw bars may be rotated  
“ and also lowered and raised ” by means of suitable gearing  
connected with “ a slide and belt shipper, the above parts being  
“ used in connection with two cones, a belt, and two cylinders;  
“ one cone and cylinder being placed on an axle of each  
“ carriage, and the other cone and cylinder on a lever which is  
“ connected to a chain attached to the brake bars.”

The details of the invention are set forth at considerable length, but will only be understood with the aid of the Drawings annexed to the Specification. Various modes of actuating the tumbling rods may be adopted, but one mode is described in which a hand wheel fixed at the top of a vertical shaft is used, this acting upon the tumbling rods through the medium of certain spur and bevil wheels, the tumbling rod upon which this apparatus immediately acts being mounted in adjustable bearings, so that it may when desired be placed out of connection with such apparatus. Instead of the tumbling rods being placed above the axles, they may, if desirable, be arranged below them, this arrangement rendering the raising or lowering of the tumbling rods in order to adapt them to “ different heights of carriages ” unnecessary, such adaptation being needful when the rods are placed above the axles.

[Printed, 1s. Drawing.]

A.D. 1862, March 15.—N<sup>o</sup> 719.

GRANT, JOHN.—“ Improvements in the construction of portable railways, and in the trucks or carriages to be used thereon.”

One part of this invention relates to the construction of a portable railway which is more especially meant for use in agricultural operations. The rails, which are “ plate rails,” are secured to longitudinal wooden sleepers, of such length as to be easily removeable, such sleepers, when laid end to end, being united by tongues and sockets, and kept at the proper distance apart by transverse tie rods, bent up at their ends so as to enter holes or sockets in the sleepers, such transverse rods, if desired, carrying pulleys for supporting a rope when stationary engines are used to propel the trucks upon the rails. Crossings, turn-outs, and other suitable appendages are applied to the rails, and



the ground is prepared to receive the sleepers by means of ploughs which are mounted in a frame carrying also heavily weighted rollers, which run in the furrows made by the ploughs, and so consolidate the ground upon which the sleepers are to rest, the different parts of this apparatus being capable of adjustment at pleasure.

Another part of the invention relates to the trucks, waggons, or carriages meant for use upon the portable railway. Such trucks, waggons, or carriages are for the most part provided with two running wheels only, but may also be provided with a pair of small supporting wheels. One of the running wheels is fast and the other loose upon the axle, and two or more of these vehicles may be joined together by their end frames "so as to form four" and six-wheeled carriages if required to carry a bulky load." The bodies of these vehicles are connected to the framing by hinge joints, so that they may be made to tip and deposit the load when required, the arrangement being such that the tipping may be performed either endways or sideways, as requisite. Certain small guide wheels may serve to support the body of the vehicle when tipping, such guide wheels being lifted off the rails when the vehicle is required to turn out of the track. The larger vehicles are provided with self-acting tail-boards, these being furnished with pins or catches by which they are held in position, except when the bodies are tipped, when they are allowed to open and the load passes out below them.

The trucks or carriages may be of different forms, according to the purpose for which they are intended, and for harvesting or carting hay they will not require to have any sides, "except a" narrow beading round the edge to prevent any grains of corn "or seed from falling off the truck and being lost."

[Printed, 1s. 6d. Drawings.]

A.D. 1862, March 26.—N° 839.

CARR, HENRY.—(*Provisional protection only.*)—"Improvement" in applying lubricating fluids to the journals of railway "carriages and locomotive engines."

This invention consists in effecting the lubrication of railway axles "while the same are in motion" by causing a spring which is fixed in the "grease box" of each axle box, and which spring receives a vibratory motion from the shaking of the engine

carriage when in motion, to convey by contact a small quantity of the lubricating fluid to a capillary thread, which thread conducts such fluid down a small tube to the journal of the axle, such tube being fixed in the bottom of the grease box, and rising above the level of the lubricating fluid. In order to prevent the lubricating fluid from splashing, the grease box is divided by perforated partitions into a number of cells, there being, moreover, in some cases small floats of cork, wood, or other suitable material, placed upon the surface of the fluid.

Different modes of arranging the spring and thread may be adopted, one arrangement being described in which the spring receives lubricating material and conveys it to the thread through the medium of pads. In another arrangement one end of the spring dips into the lubricating fluid, and has the thread attached to it; and in another case the spring is mounted upon a float in the grease box, instead of being fixed therein.

[Printed, 4d. No Drawings.]

A.D. 1862, March 31.—N° 896.

**BURLEY, RICHARD.**—"An improved material for forming or lining the bearings of axles and shafts, and other rubbing parts of machinery."

According to this invention the bearings of axles and shafts and other rubbing parts of machinery are composed of or lined with "an alloy consisting of iron, copper, tin, and zinc, combined with a small quantity of sulphur, and sometimes also of arsenic." The proportions in which these ingredients are used may be greatly varied, but the patentee states that the materials may be "conveniently" employed in the proportions of 130 parts of zinc, to 40 parts of tin, 28 parts of copper, 2 parts of iron, 1 part and a half of sulphur, and 1 part of arsenic.

The composition thus produced is cast in the usual manner into the various forms required.

[Printed, 4d. No Drawings.]

A.D. 1862, April 2.—N° 930.

**BLACKBURN, BEWICK.**—"Improvements in apparatus for lubricating locomotive and other axles."

These improvements have reference to the invention for which

a Patent was granted to the present patentee on the 13th of June, 1861, No. 1524, and are thus set forth :—

“ Instead of placing the packing or stuffing used for spreading the oil on the journal below the journal it is fixed above the centre of the journal, and in contact with it, and in such a position that the packing and the brass bearing shall wear away simultaneously together, and thus the packing remains always in contact with the upper part of the journal as long as the bearing lasts.”

[Printed, 6d. Drawing.]

A.D. 1862, April 2.—N° 935.

LEOPARD. WILLIAM.—“ Improvements in railway brake apparatus.”

“ This invention relates to brakes “ in which the momentum of the carriage is utilized to produce the power applied, and consists in the arrangement of parts whereby the power is transmitted from the shaft receiving the impulse from the running wheel axle of the carriage to the brakes.” To receive the power the patentee employs an endless screw “ into which a screw wheel and shaft is lowered when the brake is applied,” this shaft being “ disposed longitudinally at mid-breadth of the carriage,” and there being at the opposite end thereof from the screw wheel a bevil wheel, gearing with another bevil wheel, or a segment of teeth, mounted on the vertical axis, the latter carrying a spur pinion, which is disposed between two horizontal racks. These racks are capable of sliding to and fro on rods, the ends of the racks, when moved in either direction, abutting against surfaces terminating the ends of rods which communicate the thrust to the brake bars. The latter are arranged “ across the breasts or treads of the wheels,” and supported in suitable guides. The thrust rods apply the pressure to the brakes through the medium of springs, and the rods on which the racks slide may be “ fixed in one of the thrust rods, and slide in suitable sockets in the other to support and keep them in a direct line with each other, or they may be short, and fixtures to each thrust rod, and be received and slide in sockets or holes in the racks, the object being to permit of the rack pinion operating on either, and yet to produce the same effect in applying the brakes.”

The shaft mentioned above is raised and lowered by means of

a cam fixed upon a longitudinal shaft placed above it, each carriage being provided with one of these shafts as well as one of the shafts first mentioned, but the last-mentioned shaft being so contrived that the shaft of one carriage may be coupled to that of another, and thus a simultaneous action of the brakes of the whole train be produced. The springs already mentioned, through the medium of which the brakes are pressed against the wheels, serve also to withdraw them therefrom on the action of the racks ceasing, this resulting from the withdrawal of the screw wheel from the screw on the axle, but arrangements are made by which the brakes may be kept in contact with the wheels after the latter operation has been performed, such arrangements consisting in some cases in the employment of a brake strap, which is made to act upon a drum fixed on the screw wheel shaft through the medium of certain levers; and in other cases in the use of a ratchet wheel on that shaft, with which a suitable pawl is arranged to work. In order to prevent injury to the apparatus, the pinion on the screw shaft has one or two teeth removed therefrom at one part of its circumference, which prevents it from being operated upon by the screw on the axle beyond a certain point, and a dial is so contrived as to show to the brakeman "the position of the " brake apparatus."

Different modifications of the details of the invention may be made, and the coupling of the shafts of the different carriages already alluded to is effected by fixing circular plates at the ends of such shafts, such plates being notched, and there being behind them collars having arms jointed thereto, such arms being capable of assuming either a horizontal position, in which case the arms of one carriage enter the notches in the plates of another, or a vertical or radial position, in which case the couplings are disengaged.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, April 10.—N° 1034.

**BARTHOLOMEW, CHARLES, and HEPTINSTALL, JOHN.**—

"Improvements in making circular blooms, such as are used in "the manufacture of tyres, and for other purposes."

According to this invention a puddled bar of iron is cut into segments or radial pieces, the cuts being made "to slope alternately in either direction," and the pieces when laid together

making up "a complete polygonal ring." A small bar of iron is then formed into a "flat coil," and upon this a number of the radial pieces are laid in a circle, upon these other circles of such pieces, "breaking joint" with the first, and afterwards other circles in succession, each breaking joint with the other, until a pile is formed of sufficient thickness. Upon this a flat coil is laid, similar to that on the lower side, and the pile, with the coils, being placed in a suitable die, the whole are welded together by hammering. A punch is then struck through the bloom thus formed, consolidating the iron laterally, "and the whole is sufficiently hammered for thorough consolidation." A bloom may thus be formed from cast or blistered steel as well as from iron. Or a bloom may be composed of iron and steel combined together in various forms. Thus iron and steel bars may be cut into pieces of suitable form for being so arranged that the outer portion of the bloom or that next the circumference shall be of steel, and the inner portion of iron. Or a pile may be formed of a top and bottom coil of steel, with radial pieces of iron between the two, the pile being afterwards completed by enclosing it in a spiral coil of steel, and a bloom being thus obtained "having a thin coating of steel both externally and top and bottom." These blooms may all be rolled upon the system for which a Patent was granted to the present patentees on the 14th of May, 1857, No. 1369.

[Printed, 10d. Drawing.]

A.D. 1862, April 14.—N<sup>o</sup> 1074.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Nicolas de Maklakoff.*)—"Improvements in carriages for transporting loads on railways, common roads, and other surfaces."

This invention consists essentially in the employment of a long cylindrical vessel, having hemispherical ends, there being passed lengthwise around this vessel endless chains composed of links of iron, and these chains being connected to the axes of a number of rollers which travel round the vessel during its progress, those beneath it for the time being serving as wheels thereto. Around each outer side of the vessel is a rail against which the rollers work, and merchandise may be carried both inside the vessel and also by a carriage or cart mounted above it, the latter being also capable of accommodating passengers. When this apparatus is

meant to travel on common roads, the rear end of the cylindrical vessel has an aperture formed in it for the reception of a lever, "to make as easy as possible the turning of the carriage," and for "going down inclines" certain racks are connected to the links of the chains, and made to operate upon a toothed wheel which is connected to a pulley, the latter being apparently meant to act as a break. The patentee mentions, however, that carriages constructed according to this invention may be provided with breaks and "all other accessories" usually adopted in carriages constructed in the ordinary manner. Different modifications of the invention may be made, one arrangement of the apparatus being described which is set forth as being specially adapted for use on railways.

[Printed, 1s. 8d. Drawings.]

A.D. 1862, April 16.—N° 1102.

**ROWAN, JOHN MARTIN.**—(*Provisional protection only.*)—"Improvements in manufacturing articles of cast steel."

This invention relates to "means of obviating, preventing, or removing the 'honeycomb' or porous condition to which articles of cast steel, as hitherto manufactured, are found subject;" and the invention consists "in applying pressure, by means of hydraulic apparatus, for example, to the cast steel in the moulds when in a fluid or nearly fluid condition, such pressure consolidating and greatly improving the cast steel, and also rendering it better suited for subsequent treatment by hammering or rolling. The term 'cast steel' is intended to include metal converted by the pneumatic process."

The details of the invention must be varied according to circumstances. In the case of a railway tyre, for example, the pressure may be applied "by means of a conical centre piece formed with a flange, which shapes and compresses the flange edge of the tyre, the conical part at the same time forcing out segmental pieces against the inside surface of the tyre; or the pressure may be applied solely to the flange edge, or solely to the inside surface of the tyre."

Other arrangements are described as being applicable to the formation of guns and tubes.

[Printed, 4d. No Drawings.]



A.D. 1862, April 16.—N° 1112.

JOHNSON, JOHN HENRY.—(*A communication from Claude Marie Bathias.*)—(*Provisional protection only.*)—"Improvements  
" in railway and common road carriages."

This invention relates to "a peculiar mode of mounting rail-  
" way and common road carriages upon their running wheels, and  
" consists in mounting such vehicles upon wheels, rollers, or  
" cylinders, which rest at their peripheries upon the ordinary axles  
" of the vehicle. The axles of the upper and lower wheels are  
" by this system considerably reduced in diameter, and hence the  
" friction is reduced, and a considerable saving of tractive power  
" is obtained. The upper wheels are mounted in forked guard  
" irons, which take the entire weight of the load, suitable springs  
" being adapted thereto. The axles of the upper and lower  
" wheels may be allowed to work freely within slots or openings  
" made in the forked guard irons, and in some cases one or both  
" the lower wheels may be loose on their axle to facilitate turning  
" on the passing over curves."

[Printed, 4d. No Drawings.]

A.D. 1862, April 17.—N° 1129.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Richard Dover Chatterton.*)—"Improvements in buffing appa-  
" ratuses and in draw springs."

This invention consists "in the employment of wedge-shaped  
" blocks, connected to the buffer heads through their rods and a  
" cross bar, or otherwise, and to the draw rods, which wedge-  
" shaped blocks are pressed upon by springs directly, or by jaws  
" acted upon by springs, in order that the ends of the springs or  
" of the jaws may be kept in contact with the sides of the wedge-  
" shaped blocks."

The patentee mentions various modes of applying the invention.  
For example, "a wedge or wedge-shaped block may be fixed on  
" the back of the buffer head, and two rods or jaws may be fitted  
" under the carriages, with the division between the two outer  
" ends of such jaw opposite or in a line with the point of the  
" wedge," springs keeping the jaws closed until the pressure  
applied to the buffer heads forces the jaws apart. In some cases  
the wedge may be in the form of a spear head, and studs may be

applied on the inner ends of the jaws, "in order to enter behind the spear head and prevent the back action of the springs." In other cases one buffer head, one wedge or wedge-shaped block, and one set of jaws and springs are used. In other cases draw springs are formed by applying at the back of the draw hook a wedge or wedge block with jaws and springs, the point of the wedge being "placed in the reverse direction." A draw spring and buffer apparatus may be combined together by the employment of a double wedge or double wedge-shaped block and a set of jaws and springs for each wedge or block. And arrangements are also set forth by which one set of springs may be made to act "upon the buffers and draw hooks at both ends of the carriage," this being effected by the use of certain cross bars, draw rods, and elliptical plate springs.

"The buffing apparatuses may be used for stationary purposes as well as for carriages."

[Printed, 10d. Drawing.]

A.D. 1862, April 17.—N<sup>o</sup> 1132.

RIDEAL, SAMUEL, and SHEPHERD, ROBERT.—"Improvements in railway brake apparatus."

This invention relates to apparatus "for applying a brake block to the tyre or periphery of each wheel of each vehicle throughout a train, and consists of one or more rods or bars, by preference of T-iron, carried in suitable bearings, fixed to the under side of the framing of railway carriages, with a head fixed at each end of said rods, to which head is attached a catch, so arranged that when one head is pressed against the other in the manner of the buffers of a train they become connected, and so remain until each shaft is again withdrawn into its normal position, when the catches become detached. The motion, which is produced by thrusting, as exercised from the engine, tender, or guard's van, may be given by either steam power or by the ordinary gearing, or any other method. In the centre of each bar or shaft is cut a double inclined plane, which plane presses against a friction roller carried on the end of a lever standing upright from the ordinary brake rocking shaft; by the deflection of the roller arm from its position in either direction the rocking shaft is rotated, and the brake blocks fixed to the tyres of the wheels by the ordinary slide

" bar, or by means of a double set of spring elongating thrust rods jointed to the brake hangers by socket joints, so as to allow of a motion in either direction, and according to the way in which the vehicles may be running."

"The action may be compared to the driving a wedge between the under frames of carriages and the tyres of the wheels, and has the advantage of bringing into use the momentum of the train to retard itself, and entirely removes any check or strain on the coupling chains, which by the ordinary mode are kept in a state of tension during the time the trains are being brought up." Instead of "elongating thrust rods," however, to communicate between the brake blocks and the rocking lever, the patentees sometimes employ thrust rods having short cross heads upon them, and operated upon by means of cams fixed on the rocking shaft, "and this in whichever direction the rocking shaft may turn on its axis." The details of the invention are minutely set forth.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, April 21.—N° 1153.

MONCKTON, EDWARD HENRY CRADOCK.—"Improvements in the preparation of metal to be used in the construction of cannon, rifles, armour plates, and other objects used in naval or military warfare or otherwise."

One part of this invention consists in the employment of electricity, in a furnace of peculiar construction, "for cementing and wholly or partially converting into steel iron used for ships of war," and other purposes, "and also for railroad wheel tyres." The furnace consists, by preference, "either of a circular building having double walls with a fire-place at the bottom, having either an iron slab or arch above, the exterior being of considerable thickness, and the interior one thin. The interstice between the two walls is converted into flues, which may be made slanting, or perpendicular from the basement to the top. The space inside is made large enough to take in the largest or smallest pieces of metal and tyres; these are laid over each other, and connected by proper conductors of iron, with charcoal in powder two inches thick or more laid between each; the top is then covered with sand; a dome is placed above the flues, so as to make a draught; a doorway is

“ placed at the side for the purpose of packing the iron and charcoal, which is subsequently built up before firing.”

The electricity may be generated by any known means, “ and with or without the use of coils of induction ” and other apparatus. The invention includes various matters which are not set forth as having any particular connection with the subject of the present series of abridgments, these including the employment of iron and steel made from iron sand and its matrix ; and also improvements in common iron and steel by “ direct fusion of iron and steel with the iron sand itself,” and also “ by welding it with the iron or steel prepared from iron sand in such proportions as may be found convenient.” Also uniting iron and steel made from iron sand by means of electrical deposits, or without the intervention of electricity. Also the smelting of iron sand mixed with charcoal and fluxes, or unmixed, or in combination with coal, coke, charcoal, or wood, or otherwise ; and by the aid of hydrogen gas in conjunction with common air, or oxygen gas, or any or all of these combined, and with or without the aid of electricity. Where the latter is employed any of the known means for the removal of impurities, and saving them, when of use, may be adopted, and where the sand contains more valuable products, such as platinum or silver, these can also be separated.

The patentee also uses the solution of asbestos and mica with alkaline carbonates and caustic alkalis for preserving the metal of ships, cannon, armour plates, and metal generally, from corrosion and marine deposits. Cannon may also be constructed according to this invention of any form or shape, metal being superadded at the parts desired, or they may be formed in separate pieces, and the pieces joined together by means of projections or flanges which may be screwed together.

The invention is also described as applicable to various warlike purposes, the details of the whole invention being set forth at considerable length.

[Printed, 6d. No Drawings.]

A.D. 1862, April 24.—N° 1192.

HAGGETT, WILLIAM.—“ Improvements in locomotive engines “ and carriages for railways, part of which improvements are “ applicable to carriages and vehicles for tram and common “ roads.”

The chief object of this invention is "to increase the safety of railway trains travelling at high speeds, principally by providing a ready and effectual method of retarding their progress, or stopping them, as may be required. For this purpose there are attached to the axle boxes, or other fixed points on the framework of the locomotive engine or railway carriage, flanged friction blocks or brakes, which can be brought down upon the rails by a lever or other mechanical power, whereby the wheels will be lifted clear of the rails, and the whole weight thrown upon the flanged friction blocks or brakes, thus converting the engine or carriage into a sledge, by which means its progress will be retarded or stopped, as may be required. The levers or other apparatus employed to give motion to the friction blocks or brakes are also available as a medium of communication between the engine and the carriages," and in order to prevent such engine and carriages from running off the rails "guiding wheels are attached thereto, which guiding wheels remain in contact with the rails when the engine or carriage is lifted, as before described."

For carriages meant to travel on tram or common roads the friction blocks or brakes are without flanges.

Various modes of carrying out the invention are described, the details of the invention including different arrangements of levers, connecting rods, rollers, chains, and other apparatus through the medium of which the brake blocks may be forced downwards by the exercise of manual power, certain "supplementary buffers" being also described as applicable to railway engines and carriages, which in the event of a collision, press the blocks down upon the rails. In carriages for common roads and tramways the blocks may be pressed downwards by the use of a "footboard," or by means of a screw or other suitable mechanism, one arrangement being described in which a "drag" or shoe is allowed to fall in front of one of the wheels of the vehicle by releasing a strap or chain which at other times keeps it in a raised position.

[Printed, 10d. Drawing.]

A.D. 1862, April 24.—N° 1203.

OFFORD, JOSEPH.—(*Provisional protection only.*)—"Improvements in carriages."

This invention relates to "railway and other public vehicles" as well as to private carriages, and the object of the invention "is by an improved principle of construction to increase the strength, utility, and durability of the parts, and to lessen the effects of concussion by improving the wheels, steps, and parts in connection therewith." The wheels are improved "by constructing the nave stock or centre part of wrought iron, forged whole, bored and hardened so as to obviate the necessity for a separate axle-box, and tapped so as to receive the spokes," which are made of wrought iron or other metal and screwed into the nave. In forming the felloes or rim of the wheel the inventor introduces "a laminated principle of construction, using wood, vulcanite, india-rubber, and iron or steel or other suitable metal." The steps are improved "by fitting to the bottom of the door, upon a dead pin, a radial bar or rod, jointed at the other end to a slide, made by preference of copper or zinc, and placed outside and under the carriage, and from this slide or second bar or radial rod, jointed upon dead pins or otherwise, is attached a rising and falling step. This step is so constructed and fitted that the tread is considerably longer than the limb, so as to provide more space or length for the foot, the extra tread being let in between the door and the bottom side rail of the carriage floor, and made to rise and fall by the action of the radial rods as the door opens and closes;" the step thus acting if necessary "as a step to the door." In order to lessen the effects of concussion in the wheels the inventor proposes "to introduce a chemical combination of soft india-rubber and vulcanite between the centre of the axle box or iron nave and that portion of the nave which receives the spokes," which may be effected by covering an ordinary cast-iron axle box, or a nave of wrought iron or other metal "with two layers of vulcanite, separated by a layer of soft rubber, all chemically united in the process of manufacture," there being embedded in the outer layer "a ring of wrought iron or other metal to receive the spokes."

[Printed, 4d. No Drawings.]

A.D. 1862, April 25.—N° 1210.

MANSELL, RICHARD CHRISTOPHER.—"Improvements in the construction of wheels to be used on railways."



These improvements consist "in making certain combinations of grooved, filleted, or flanged tyres in connection with grooved, filleted, or flanged plates or rings, for securing the tyres on to the bodies of wheels, and preventing the said tyres flying off in the event of their breakage, and grooved, filleted, or flanged rims of wheels and other appliances in connection therewith."

Different modes of carrying out the invention are described. In one arrangement the tyre is grooved on each face or side, flanged securing plates and bolts connecting the tyre to the rim of the wheel, and there being between the rim and tyre a "cushion" of wood. The rim is grooved as well as the tyre, and the flanges of the securing plates enter the grooves of both. In other cases the securing plates form continuous rings, and whether composed of short lengths or of continuous rings they may, if preferred, pass underneath the interior periphery of the rim instead of the latter being grooved. Short lengths may also be used at one side of the wheel, and a continuous ring at the other. Wheels formed with spokes composed of bent bars need not, according to this invention, be made with a "continuous rim."

According to the Provisional Specification another part of the invention consisted in fastening securing plates or rings to the tyres of wheels, and also to the rims, by hammering the edges of the tyres, or of the tyres and rims, over the edge or edges of the securing plates or rings, or fastening them at one side only by such means in connection with tyres having projections or flanges to clip or grasp the rims on the other side. In the Final Specification, however, the patentee disclaims this part of the invention on the ground of want of novelty.

[Printed, 10d. Drawing.]

A.D 1862, April 30.—N° 1268.

DAVIES, GEORGE.—(*A communication from François Ferdinand Auguste Achard.*)—"An improved electric apparatus, applicable to various useful purposes."

One part of this invention relates to the application of electric apparatus or gearing to the working of breaks, signals, and other apparatus on railways; as well as to feeding steam boilers, to water gauges, pressure gauges, and safety valves, and regulating the temperature of gas, and of air and fluids in general. "These

" results are obtained by the action of an electric pile, with  
" optional intermittent contact, acting either manually or auto-  
" matically upon appropriate gearing or apparatus. The gearing  
" in its turn directs and determines the movement to be obtained,  
" either in applying power to wheels for railway breaks, for  
" instance, or acts upon the first movers or organs themselves,  
" which the said gearing may either actuate or regulate."

A modification of the invention is described as suitable for applying a railway break, in which the motive or rotative power " of the wheel is employed to act upon the break." On one of the axles of a railway carriage is fixed an excentric cam, a lever resting upon this which has its fulcrum on an axis or shaft carrying a ratchet wheel, the lever being loose upon the shaft, and being provided with a click or pawl for acting upon the wheel. To the shorter arm of a lever are jointed two flat pieces or slides of iron, which embrace the four poles of a double electro magnet, so as to be always in contact with these poles and form the armatures of the magnet. The slides are connected at their upper part by a bolt to a spring fixed on the frame of the carriage. Thus at each revolution of the axle the excentric cam, revolving also, lifts the lever, and causes the click to take up a tooth of the ratchet wheel, the slides at the same time descending and compressing the spring, and so causing the lever to bear constantly against the cam. On the axis of the ratchet wheel is mounted a pulley or cylinder, around which a chain is coiled which is connected to the lever of an ordinary break, and thus the latter is applied to the carriage wheel, the arrangements being such, however, that a break may be applied to each wheel if necessary. The application of the break or breaks is made " with an increasing pressure till the wheels cease to turn." When the break apparatus is not required to act the electric current is caused to circulate through a battery or pile placed in the train, and a magnet which is connected therewith, the result being that the slides or armatures are seized, and prevent the spring from pressing down the lever upon the cam, the latter then not acting upon it; and the breaks are unlocked from the wheels by the action of a clutch and certain other apparatus connected therewith which is worked by hand. Different modifications of this part of the invention are described.

The other parts of the invention do not require notice here.

[Printed, 1s. *Drawing.*]

A.D. 1862, May 3.—N<sup>o</sup> 1312.

SNOWDON, THOMAS. — (*A communication from Pierre Mourrier.*)—"Improvements in the manufacture of steel tyres, hoops, and cylinders, and in furnaces employed therein, and applicable to the melting of steel generally."

This invention relates to the manufacture of steel and steel tyres for railway wheels, hoops, and cylinders, and to the crucibles and furnaces employed therein, "and consists, 1st, in making the crucibles of a different form to those hitherto used, and in adapting them to the shape of the castings, tyres, hoops, and cylinders required; 2ndly, in the form and construction of the furnaces intended to be employed therein. The improvement in the crucibles, viz., in adapting them to the shape of the casting, dispenses with all moulds, and renders the usual moulding process, by which sound castings are obtained with difficulty, unnecessary. The crucibles, instead of being in the ordinary shape, are made of a concentric form, and the materials are fused therein, and when cooled down the crucible is broken off, and a sound casting is attained." When the shape of the casting admits of its being withdrawn from the crucible, the latter need not be broken, but if it has resisted the action of the fire, may be used again. The crucibles may be made of the usual material.

Another part of the invention consists "in so forming the furnace, and applying the heat, that the body of the fire does not come into direct contact with the crucible, but the latter is heated by the flame and gases from the furnace fires, which are placed in chambers on the outside of the oven or crucible chamber. The fires are fed from the top," and the arrangements are such that "the flame, clear heat, or gases generated from common slack coal, will answer nearly as well by this improvement as the best qualities of coke in the common furnace and crucible."

The details of the invention may be variously modified.

Printed, 8d. Drawing.]

A.D. 1862, May 7.—N<sup>o</sup> 1356.

NETHERSOLE, WILLIAM EDWARD.—(*Provisional protection only.*)—"Improvements in parts of railway trucks and waggon, parts of which are applicable to railway carriages."

This invention has for its objects, firstly, to prevent loss of life or damage to railway stock arising from the failure of the "draw gear" of railway carriages and waggons; and, secondly, to afford facilities for unloading coal or other minerals from railway trucks.

In order to accomplish the first part of the invention the inventor proposes "to make the draw bar, the ends of which are enclosed in a cradle, act upon springs of india-rubber or other suitable elastic material, which springs shall be attached or fixed on the ends of the side chain rods, so that in the event of the draw bar or any portion of the draw gear failing the strain would immediately fall upon the side chains," which would then "prevent the train from parting, or any damage or other accident arising."

In carrying out the second part of the invention there is placed on the end of each truck or waggon a door or flap, "which not only, if necessary, forms an end to the truck, but when opened forms a shoot for facilitating the tipping from railway waggons. This shoot can be used either with or without a hanging flap or end of truck, as by increasing its height it would act in itself as an end flap or door."

[Printed, 4d. No Drawings.]

A.D. 1862, May 7.—N° 1359.

DE BERVILLE, CHARLES VICTOR FOURNIER. — "An improved safety coupling bar for locomotives and other railway carriages."

This invention consists "of a self-acting apparatus for the prevention of a train following a locomotive in the event of a locomotive deviating from the right line of rail," provision being also made by which the carriages may in case of need be instantaneously detached from the locomotive by the driver of the latter.

From the hinder part of the framing of the locomotive proceeds a strong bar of iron, at the end of which is a block of metal, which is cylindrical on the outside, but has an opening through it which is conical, the opening being widest at the upper end of the block. The latter is furnished with certain notches, into one of which is passed a horizontal ring mounted at the end of a strong bar proceeding from the front of the waggon next the engine, and a

conical plug being then dropped into the opening in the block, and passed through the ring, the connection between the engine and the rest of the train is thereby formed. This plug, however, is connected to a strong spring which has a constant tendency to lift it so as to pass it above the ring, this being prevented during the ordinary travelling of the train by means of a key mounted upon a pivot carried by a projection from the lower part of the block, and which enters a notch in the lower part of the plug, this key being held in position by a piece of metal of horse-shoe form connected to a shank carried by the front waggon, this shank, however, being in connection with a lever by which it may be raised when necessary from the key. The result of the whole arrangement is that so long as the engine and rest of the train travel in a line along the rails the connection between the former and the first carriage remains secure, but upon the engine diverging from the line the key is moved out of the notch in the plug, and the train disengaged from the engine. And the same effect may also be produced at any time by the use of a line or rod connected to the lever and shank mentioned above, by which the shank may be removed from the key, a second line then placing the key out of contact with the plug. When the latter is being inserted into the block and ring, in order to couple the engine with the train, the spring connected with the plug is forced down by the use of a screw turned by a handle, the screw being then again released therefrom; or if it be desired from any particular cause that the apparatus shall not come into action, the spring may remain pressed down by the screw.

[Printed, 8d. Drawing.]

A.D. 1862, May 7.—N<sup>o</sup> 1365.

JOHNSON, JEREMIAH, and CHAPMAN, ARTHUR.—“Improvements in apparatus for preventing collisions on railways.” This invention consists, firstly, of certain “retarding breaks” which can be made self-acting, and are intended to be fitted to the break van, and to all the carriages, or to any required number of carriages, of a train.” Secondly, of a “stopping break, which can be applied at any moment, and may be used apart from the retarding break, or in conjunction therewith.”

Thirdly, in “gearing for actuating the above breaks.” The retarding breaks are composed of rings or wheels fixed to the

wheels or axles of the carriage, around which spring break bands, lined, if necessary, with blocks of wood, are passed. These bands encompass the whole or nearly the whole of the peripheries of the break wheels, the two ends of each band being jointed to a short lever, by the motion of which on its fulcrum the band may be tightened upon the break wheel. These break bands may be applied to the break wheels either simultaneously or one after another, in succession, by means of draw rods passing from lever to lever on each carriage, the levers of one carriage being coupled to those of another by suitable means, and the whole being moved by a wire rope or chain passing round a pulley in the break van, which may be turned by suitable gearing, the arrangement being such that turning the pulley in either direction will bring the breaks into action. A ratchet wheel and pawl in connection with this gearing is used to keep the breaks pressed upon the wheels when applied, and on the removal of the pawl from the wheel they are removed therefrom by springs. Instead of draw rods and a rope or chain, rotating rods may be used, these bringing the breaks into action through the medium of screws, or wheels and racks, such rods being coupled by means of universal joints and expanding and contracting coupling collars. The "stopping breaks" consist in reality of ratchet wheels, which are connected to the break wheels already mentioned, or otherwise fixed upon the axles of the carriages, and into gear with which pawls are made to pass when the retarding breaks have reduced the speed of the train, these pawls then preventing any further rotation of the wheels of the train; and arrangements may be made by which the buffers of the train will bring both the retarding and stopping breaks into action on the speed of the engine being reduced, and the carriages tending to overrun each other, all the breaks again being released on the speed of the engine being accelerated. Stopping breaks, such as mentioned above, may be used in combination with the ordinary lever block breaks, the pawls and wheels of such stopping breaks being either "double acting" or capable of acting when the carriage is moving in either direction, or capable of acting in one direction only.

[Printed, 4d. No Drawings.]

A.D. 1862, May 7.—N° 1372.

MARCHAL, Désiré, and DE WIART, ADRIEN CARTON.—

"An improved method of preventing the destructive effects of



" vibration or jar on the permanent way of railways, and on the wheels, axletrees, and other parts of carriages, and the working and other parts of machinery liable to shocks."

This invention consists in the application to those parts of railways, of railway and other carriages, and other parts of machinery which are liable to shocks " of a band, plate, washer, or lining of lead, tin, zinc, copper, or an alloy of these metals, or either of them," the patentees stating that the same " principle " may be applied to the bearings of iron bridges.

One arrangement is described in which a flanged railway wheel is furnished with a tyre of lead, which is placed outside the periphery of the wheel, although the patentees state that such leaden tyre might be interposed between the rim of the wheel and the iron or steel tyre. A carriage wheel for ordinary roads is also described in which a tyre of lead is let into the ordinary tyre; the leaden tyre being in each case secured in its place by means of bolts, screws, or other convenient means.

The invention is also set forth as applied to wrought iron railway sleepers with their chairs and rails, lead being applied between the chairs and rails and also between the chairs and sleepers; lead being also applied in cases in which wooden sleepers are used, and also between the beams of iron bridges and in cases in which beams of iron and wood are placed together.

[Printed, 1s. Drawings.]

A.D. 1862, May 12.—N° 1430.

LANSKY, ERNST FERDINAND.—(*Provisional protection only.*)—

" An improved mode of and apparatus for working railway carriage brakes."

The inventor proposes " to utilize the power obtainable from the rotating axles or wheels of the carriages and engines and apply the same to draw the breaks into contact with their respective wheels when the speed of the train is required to be slackened."

The particular mode of carrying out the invention may be varied, but an arrangement is described in which there is mounted upon one of the axles of each carriage of a train a belt pulley, there being midway between the axles a transverse shaft, having upon it a fast and a loose pulley, upon which a driving belt from the pulley first named is arranged to work. On the transverse shaft are also

chain wheels, from which chains pass to the ordinary pendent brakes, and when it is desired to apply the latter to the wheels, the belt being thrown upon the fast pulley causes rotation of the shaft, and the chains operate the brakes as requisite, the belt slipping in case there should be "a tendency to put undue pressure on the brake chains." The movement of the belt (which works on the loose pulley when the brakes are not required to act) is effected through the medium of apparatus connected with a longitudinal rod, furnished with a hand lever or other suitable means by which it may be turned in its bearings, and the longitudinal rod of one carriage may be united to that of another by an "universal joint coupling," by which arrangement the rods of all the carriages of a train may be turned simultaneously, and the breaks thereof simultaneously applied.

"Instead of taking the power for putting on the brakes from the axles of the running wheels the winding up motion may be taken directly from the wheels, if thought desirable."

[Printed, 4d. No Drawings.]

A.D. 1862, May 15.—N° 1467. (\* \*)

DICKER, JOHN.—"Improvements in apparatus for the delivery of bags or parcels from railway trains in motion."

"To the near side of the railway carriage is attached one or more projecting arms from which the bag or parcel to be delivered is suspended. When the bag or parcels have been delivered, these projecting arms are drawn up close against the side of the carriage by means of a counter-balance weight inside. At the corresponding side of the railway there is erected an upright receiving standard and frame-work, furnished with diverging lines to disengage the bag or parcel from the projecting arm. As soon as the bag or parcel leaves the projecting arm it is received upon an inclined platform, which conducts it down behind the standard clear of the rails. Any required number of bags or parcels can in this way be delivered at a station from railway trains while in motion."

[Printed, 8d. Drawing.]

A.D. 1862, May 16.—N° 1485.

THIRION, ALBERT LOUIS.—"Improvements in the construction of railway and other carriages."

This invention consists "in removing or relieving the axle from the direct weight of the carriage, and receiving it on metallic balls or bodies of a spherical or conical form" revolving between plates or discs, such balls or cones not touching the axle. "The plates and balls may be arranged in two different ways." According to one arrangement they work between plates connected to the inner central parts of the wheels (which plates are cupped in order to retain them in their proper positions) and other plates which are connected to the outer ends of two pieces of wood, the other ends of which rise below the body of the carriage, and form a "bridge," these ends being connected by a pin. The body of the carriage rests on this bridge, and by its tendency to press the two parts of wood into a horizontal line forces the plates at the outer ends of these pieces against the balls. In this arrangement the wheels are fixed upon the axle. The bridge may be composed of more than two pieces of wood if desirable. In another arrangement the axle is furnished with antifriction wheels, and upon these rest the lower of two horizontal plates, between which are the balls or cones, these plates turning on pivots bolted to the floor or bottom of the carriage. The invention may be applied not only to railway and ordinary carriages and carts, but also to velocipedes. "For the latter it is necessary to fix to the axle one or two lateral toothed wheels to work the treadle provided with a pawl or catch, which acts on the teeth only in descending. In raising it would slide over the inclined sides of the teeth."

[Printed, *82*. Drawing.]

A.D. 1862, May 21.—N<sup>o</sup> 1537.

MEYER, HERMANN CHRISTIAN.—(*Provisional protection only.*)  
—"Improvements in the means of stopping or retarding railway  
"and other carriages."

According to these improvements the inventor uses "the weight of the carriages or their motive power as brake power," to which end he shifts or turns the axles or bearings, and uses "excentric axles or bearings," or raises or lowers the bearings "by any other motion," or reverses the excentric axles or excentric bearings generally, thus "facing the wheels towards a brake fixed on the body of the carriage;" or he lowers "the body of the carriage (with fixed stays and brakes) on to the rails or roadway. The bearings for railway carriages should be

"excentric, and each have a moveable stopper or pawl so as to "prevent them from turning" until required, such stoppers or pawls being connected by means of levers and connecting rods or chains "to a friction gear on the driving axles of the locomotive "or engine," such gear being provided with a hand lever, within reach of the driver or person in charge of the brake. "When the "hand lever is moved it will act so as to wind up a chain connected to the levers and so liberate the excentric bearings, when "the latter will make a partial turn and so lower the brakes, "which are fixed under the frame of the carriages above the "wheels." Or the brakes may be fixed before or behind the wheels or stays, and be of such length as to reach to within a short distance of the rails, in which case the body of the carriage will, on the bearings being liberated, sink down upon the rails, the wheels then clearing such rails, the excentric bearings being made to "give a greater throw" than the distance of the stays from the rails. In order to return the carriage to its proper position a second friction apparatus, similar to that already mentioned, may be brought to act so as to turn all the excentric bearings into their first situation, in which they will be again retained by the stoppers or pawls.

The inventor states that various motions may be applied so as to have the same effect as excentric bearings or excentric axles; and that in carriages for common roads "the application of the "excentric bearing or excentric axle will cause the axle itself to "make a partial turn when break power is to be applied, although "the axle will, as usual, remain fixed when the carriage is in "progress."

[Printed, &c. No Drawings.]

A.D. 1862, May 27.—N° 1587.

CLARK, WILLIAM.—(*A communication from Augustine Irel Ambler, Roseline Nancy Ambler, and Warrick Martin.*)—(*Provisional protection only.*)—"Improvements in brakes for railroad "carriages."

According to these improvements brake bars extend across the treads of each pair of wheels of the carriage, such bars carrying shoes or brake surfaces, and being connected to the framing by springs which keep the brakes away from the wheels when they are not required to act thereon. The middle parts of these brake bars "are connected by a chain, which is diverted from the direct "line by passing round two pullies mounted on a lever, and

“ according to the position of which lever the direction of the chain is more or less diverted, and, as a consequence, applies more or less strain to draw the brake levers together, and apply them at opposite diameters of the wheels, or if applied to four wheels, one brake surface to each, the pressure of the one brake bar will be in the opposite direction to that of the other. The deflecting lever carries a long cone rigger or pulley on its free end, while a like cone is fixed on one of the carriage axles, but unlike usual cone pullies, they are both disposed in the same direction, that is, the two large ends together. At the small ends they have loose pullies, on which the straps run during the action of the brakes; when the strap or belt which encircles the cones is at the small ends the lever assumes a position to slack the brake chain, but when the belt is carried towards the large part of the driving cone it necessarily draws the cone of the lever towards the cone on the axle, and so shortens the chain and applies the brakes. This it does with a force that can be regulated to a nicety, according to the position to which the belt is carried by its stopper or traverser.” The latter is actuated by a tumbling or continuous rod, “ on which is a pinion gearing into a bevil wheel mounted on a short upright shaft, carrying a pinion taking into rack teeth, which traverses the belt shipper on its slide. The tension of the belt is relaxed on its return or inward movement taking place. Motion is communicated to the tumbling rod or shaft by bevil gear, and a hand wheel shaft which may be applied to each carriage, or as these shafts are connected, some of the carriages only need be so furnished, whereby the guard or guards can readily apply the whole of the brakes.” The longitudinal shaft or tumbling rod is mounted in adjustable bearings, in order that it may be lowered out of gear with the hand wheel gear if necessary. “ A single arrangement of the cone lever and belt apparatus is equally applicable for applying breaks to eight wheels in the same carriage, by simply causing the break chain to pass from one brake bar over a pulley attached to the opposing brake bar, thence to a pulley on a third brake bar at opposite end of carriage, and thence to the fourth brake bar, where its other end is connected, the third and fourth brake bars being the second pair. The chain, in its traverse, of course passes round the deflecting pullies on the cone lever, and to this chain,” which is composed partly of rods, are applied “ screw couplings to regulate its length.” The cone gear is mounted upon framework



or bars, supported directly from the carriage axles, the belt shipper being furnished with slides, "having rollers attached, and acted upon by springs, which have the effect of loosening or relaxing the belt or strap on its moving from the large towards the small part of the cones."

The longitudinal rod of one carriage may be connected to that of another by means of an universal joint, and other suitable mechanism, so as to enable all the brakes of a train to be brought into action simultaneously, and each carriage is provided with a dial plate and index so arranged in connection with the rest of the apparatus as to indicate the amount of pressure exerted upon the brakes. The details of the invention are very fully set forth.

[Printed, 8d. Drawing.]

A.D. 1862, May 31.—N<sup>o</sup> 1644.

LAMB, DAVID ALEXANDER.—(*Provisional protection only.*)—

"Improvements in railway buffers or apparatus to relieve concussions on railways."

In carrying out these improvements the patentee employs "a cylinder containing air, water, or other fluid; the cylinder is placed horizontally, and has a series of weighted valves upon it; a piston works on the cylinder, and at the end of the piston rod a buffer head is placed," which the inventor states that he prefers should be of lead. "When the buffer head is struck the piston is forced into the cylinder, and the air or fluid escapes by the valves, which are variously weighted, so that according to the force of the blow one or more of the valves open."

The inventor states that in some cases he employs "two pistons with rods and buffer heads, one being at each end of the cylinder," and that he then employs "a truck to carry the apparatus, one truck by preference carrying two, three, or more cylinders." He states further that when the apparatus is mounted upon an engine or tender, "or it may be on an ordinary railway carriage," he employs but one valve and piston to each cylinder, "in order to reduce the weight of the apparatus."

[Printed, 4d. No Drawings.]

A.D. 1862, June 17.—N<sup>o</sup> 1795.

HASELTINE, GEORGE.—(*A communication from Alonzo Page Winslow.*)—"Improvements in roofs for railroad cars and hurricane decks of vessels."



According to this invention the rafters or cross beams of a railway carriage are formed and connected to the sides of the carriage in any suitable manner, being slightly arched, as usual. In each side of each rafter, however, is a groove, which extends the entire length of the rafter, and partakes of its arched form, and between the rafters are placed metallic sheets or plates, the edges of which are inserted into the grooves, and which are of such length as to extend not only across the car, but also beyond the sides, so as to project into a moulding or cornice on each side of the roof, these cornices preventing the plates from moving laterally out of their places. On the top of each rafter is a cap, which extends the whole length of such rafter, the sides of this cap being turned down so as to overhang the edges of the sheets or plates. The latter may be either straight, angular, or corrugated, but they are formed by preference with the edges higher than the other parts, thus serving as troughs to receive and carry off any moisture which may find its way to them through the interstices of a wooden covering which is placed above them, or from other sources. Between the wooden covering and the sheets or plates spaces are left which serve as air chambers, through which currents of air are allowed to pass by means of openings formed in the ends of the plates, this arrangement rendering the interior of the carriage cooler than it would otherwise be. In place of grooving the rafters each of the latter may have the upper portion of each side entirely removed, and the sides of the plates be turned upwards and inwards, and the cap be bent over so as to enclose the edges of the plates, this arrangement more effectually preventing the access of rain to the plates than when grooves are used, moisture in the latter case sometimes finding its way into the interior of the carriage.

No special application of the invention to the hurricane decks of vessels is set forth.

[Printed, *8d.* Drawing.]

A.D. 1862, June 19.—N° 1809.

CARTWRIGHT, CHARLES. — (*Provisional protection only.*) —  
“Improved means of stopping or retarding trains on rail-  
“ways.”

The apparatus employed according to this invention “consists  
“principally of two strong vertical iron bars, working or sliding  
“in elongated stirrups attached in juxtaposition to the bottom  
“of each railway carriage.” On the upper parts of these bars are

spiral springs, and the lower ends of the bars are formed into hooks, and perforated above the hooks so as to admit guiding rods which are adjusted at the bottom of the carriage. Under the hooks, and working upon the guiding rods, and kept up by spiral springs, is a strong bar, which the inventor calls the "director," and which has a "stop joint in the middle, to allow of its falling in a straight line." This director, when not in use, is drawn up towards the bottom of the carriage by a chain passing over a roller or sheave, under a second roller or sheave, and connected to a sliding bar, mounted at the back of the carriage, and rising above the roof, having a perforation in its upper part for the admission of a spring bolt, by which "the whole apparatus is held up clear of the wheels."

The spring bolt of one carriage is connected with that of another by a chain and wire, and the spring bolts of all the carriages of a train may be moved simultaneously by the engineer on the approach of danger, a certain lever and other apparatus being provided by means of which he may readily act upon the series of chains and wires, and the effect of withdrawing the spring bolts from the sliding bars will be to cause all the "directors" to fall "into a straight line," and thrust the hooks mentioned above between the spokes of the carriage wheels, by which means the latter will be prevented from revolving and the train be stopped, the various springs serving to "diminish the jerk which might otherwise be seriously felt." In order to release the wheels from the hooks, after the train has been brought to a stand, the engineer backs the train, and the sliding bar at the back of each carriage is then raised by a lever or other suitable means, and the whole again retained in position by the spring bolts.

[Printed, 4d. No Drawings.]

A.D. 1862, July 12.—N° 2013.

BARBER, HENRY, and DE GARRS, HENRY.—"Improvements  
" in rolling iron, steel, and other metals for cutlery, tools, and  
" other purposes."

This invention consists in rolling iron, steel, and other metals  
" in such a manner that the material, when rolled, shall vary in  
" thickness across its width so as to correspond with the varying  
" thickness of the article for which it is intended."

One essential feature of the invention consists in the use of "excentric rolls for rolling goods singly alternately edgewise and "flatwise, the rolls being suitably grooved for such purpose," the patentees mentioning that certain articles, including "the "ends of railway carriage springs," "are already rolled singly "with excentric rolls, but flatwise only," from which it would seem that they contemplate the application of this part of the invention to the formation of the ends of such springs. They do not, however, describe any special application of the invention thereto.

The details of the invention are set forth at some length, and illustrated by a Drawing containing representations of rolls of various forms. The invention includes "the application and use "of ingots cast as nearly as possible or practicable in the same "proportion crosswise as the articles intended to be rolled are "lengthwise, and of rolls grooved proportionately to them;" also "the application of taper rolls for all kinds of bevelled "rolling;" also the application of excentric rolls for rolling table knife blades, forks, joiners' chisels, and single-ended spring knife scales, "in the sheet;" and they also describe the application of the invention to the formation of double-ended spring knife scales, plane irons, turnscrows, scythe blades, tenon saws, file blanks, daggers, skate blades, skate clogs, trowels, bayonets, and other articles.

[Printed, &c. Drawing.]

A.D. 1862, July 15.—N° 2035. (\* \*)

GHISLIN, THOMAS GOULSTON.—"Improvements in the treatment or preparation of British and foreign algæ, and the application of the same to various branches of the arts and manufactures." The seaweed "should be first steeped in dilute "sulphuric acid for about three hours," and be then dried so as to become hard, "after which it is to be ground up or reduced to "an almost impalpable powder." A strong glutinous solution is to be prepared by well mixing and boiling together ten per cent. of glue dissolved in water, five per cent. of gutta percha, and two and a half per cent. of india-rubber dissolved in naphtha or other suitable solvent of these gums, and ten per cent. of coal tar. Five per cent. of sulphur, five per cent. of resin, two and a half per cent. of alum, and, say, sixty per cent. of the seaweed (all in a dry

and pulverised state) are to be "carefully and intimately" mixed in the boiling compound, and "when the ingredients have been well incorporated the mass must be submitted to heat in a suitable oven, taking care that the mixture be not heated above three hundred degrees Fahrenheit." The mass will then be brought into a plastic state, and may be moulded, embossed, pressed, stamped, or otherwise formed into any desired shape, and thereby adapted, when it becomes hard, for various useful or ornamental purposes." A cheaper article is produced by mixing fifteen per cent. of glue dissolved in water with fifteen per cent. of heated coal tar, and intimately incorporating therewith seventy per cent. of the pulverised seaweed; the compound is to be baked as above mentioned, the heat not exceeding three hundred degrees. "This substance, when cold and dry, will become hard, and will form a good and cheap substitute for ebony." A surface resembling ivory may be obtained by boiling the substance "in a solution composed of caustic lime and water," and afterwards steeping it in dilute sulphurous acid for several hours or "even days;" it may then be "submitted to chlorine gas or chloride of lime" until it becomes bleached, and it may be necessary to repeat the process more than once. If thin flat sheets with a surface resembling ivory be required, they may also be produced from any of the tubular algae or seaweeds by splitting up the tubes and then cleaning and preparing their surfaces so that they may be used for the intended purpose when properly bleached." The surface of the prepared material may be coated with metal by the "electro-galvanic process," or it may be colored or otherwise ornamented; in the former case, however, it "must be prepared by being coated with plumbago or other material which will render the surface a conductor of electricity." Again, boiling "in a solution of sulphuric acid" or steeping "in a dilute solution of chloride of zinc," and then washing "in a dilute cold solution of sulphuric acid" will harden the surfaces and bodies of some of the before-named substances. Such substances the patentee proposes to call "laminite or laminarian stag horn," adding that they may be cut, shaped, pressed, carved, or bent into various shapes, so that they may be used for most of the purposes for which horn of various kinds has heretofore been used in the arts, and also for many purposes for which hard woods and substances, such as ebony and ivory, have been employed.

[Printed, &c. No Drawings.]

A.D. 1862, July 22.—N° 2080.

FOURNIER, AUGUSTE. — "Improvements in the manufacture of easy chairs, seats for railway and other carriages, and other kinds of seats and mattresses."

All that the patentee says is :—"I place, instead of the ordinary webbing, bands of vulcanized india-rubber across the frame of the chair or other seat or mattress, vertically and horizontally interlacing them, and fixing them to the framework, making by this means an elastic foundation, after which the chair or other seat or mattress is stuffed in the ordinary manner, and in this manner I also construct the backs of chairs where they are stuffed or padded."

[Printed, 4d. No Drawings.]

A.D. 1862, July 24.—N° 2109.

HENRY, MICHAEL. — (*A communication from Charles Fray, Vincent Paul Amédée Varenne, Louis Casimir Descouteur, and Sabin Joseph Cazier.*) — (*Provisional protection only.*) — "Improvements in apparatus for retarding and stopping carriages, especially applicable to railway carriages, and in disconnecting apparatus for carriages."

In this invention "breaks may be applied and caused to stop or retard carriages by the action of uncoupling or disconnecting the carriages from each other in the case of trains," there being according to one arrangement a chain or like agent, within reach of an attendant, connected under each carriage to a bar or shaft called the "disconnecting shaft." Each coupling hook is held to the carriage by a piece called a "key," which is kept in place by a moveable notched or hooked piece connected to the disconnecting shaft by a crank, link, or jointed lever, the arrangement being such that on the chain or other like agent being pulled the disconnecting shaft is turned partially round so as to move the notched or hooked piece and release the key therefrom, which then, being acted upon by a spring, liberates the coupling hook from the carriages, "an action which the momentum of the latter facilitates."

"Now the same action of the disconnecting shaft that disconnects the carriages also works the breaks," and for this purpose the said shaft operates the breaks preferably through links, arms, or cranks." Thus the shaft may be connected by a chain

or otherwise to a hooked or a forked piece, so contrived that when the shaft is moved, as mentioned above, it will drop an arm and cause certain clutch boxes or collars on the carriage axle to become connected or engaged, these, again, causing rotation of a pinion or wheel, which latter in turn gives rotation to "a pinion on a threaded axis." The latter is then "worked upwards," and through the medium of an arm or link working a bell-crank and certain other cranks and arms, presses the breaks against the wheels. These details may be varied, and breaks may be applied to each wheel in such manner that the wheel may be "simultaneously locked and skidded;" and the bearings of the breaks may be so mounted in "slide blocks or sliding bearings" as to accommodate themselves "to the lading of the carriage," this arrangement admitting of the breaks being "suspended from a point above the wheel." The "threaded axis" mentioned above may, if desirable, be also turned by hand in order to apply the breaks.

[Printed, 42. No Drawings.]

A.D. 1862, July 25.—N<sup>o</sup> 2117.

MANZINI, VINCENZO.—(*Provisional protection only.*)—"Certain improvements in the construction of locomotive engines used on railways, for facilitating and controlling the ascent and descent of locomotive engines and trains on inclined planes of lines of railway, and for simplifying the construction of locomotives used on railways."

As regards locomotive engines the improvements consist, firstly, in dispensing with nearly all of the mechanism at present employed; and, further, in employing only one steam cylinder instead of two, and in fixing said cylinder to the side framings of the locomotive midway between the driving wheels of the engine." It is also proposed "to employ a rotatory piston, and to fix driving cranks on opposite ends of a shaft to which said piston is fixed, said cranks to be connected each to a rod for coupling the wheels together and imparting rotatory motion direct thereto as the piston rotates."

Another part of the invention relates to the wheels of locomotive engines, "and consists in adapting thereto and across the face thereof bars of metal, capable of sliding so as to bring each end thereof successively into contact with an auxiliary



" wooden or iron rail fixed outside of the permanent iron rails, and at a short distance therefrom at all the inclined parts of a line of railway, for the purpose of preventing the skidding of the driving wheels of the engine whilst ascending inclines, and to retard and regulate the motion of the engine whilst descending inclines, that is to say, as the driving wheels rotate the upper end of each sliding bar aforesaid will be brought into contact with a curved piece of metal adjusted to each side framing of the locomotive, and by so doing the opposite end of each bar will be forced outwards and held temporarily in that position until it comes into forced contact with the supplemental wooden rails before mentioned, and tightly gripping the same the wheels will advance with certainty up the inclined parts of railway lines, and in descending will meet with the required resistance to check the impetus of the engine. The curved piece of metal above mentioned is so formed as to allow the sliding bars to rise as they are brought under the centre of the axles of the driving wheels, and said bars are so contrived as to operate when the engine is going either backward or forward."

[Printed, 4d. No Drawings.]

A.D. 1862, July 25.—N° 2119.

LAHOUSSE, ADOLPHUS.—"An improved construction of railway wheels."

This invention relates to a construction of railway wheel which will admit of the application of tyres in a cold state, and of their ready removal when it is requisite to renew them. A wrought-iron nave is used which is formed on the exterior with a conical periphery, there being a broad flange at the base of the cone, pierced with bolt holes. Instead of the wheel being furnished with spokes, discs are used, which are "divided radially into segments," two of such discs being employed, which are placed parallel to each other, but have their exterior edges bent inwards so as to "butt against each other," such edges being connected, if desirable, by means of a strap piece and rivets. Between the discs are filling pieces, and bolts are passed through the segments and also through these filling pieces, so as to secure the whole of these parts of the structure together. The tyre is formed of hollow shape in the interior, "to receive the turned over ends of the segment pieces," and there are then inserted

between the filling pieces and the nave certain wedge pieces, which are driven inwards so as to expand the segments and cause them to bed themselves in the hollow part of the interior of the tyre. The nave is afterwards bored out, and the wedges secured in their places by the application of an annular plate or cap, bolts passing through the latter and through the segments, filling pieces, and the flange in the nave mentioned above.

When the tyre is worn or otherwise injured, it may easily be removed by removing the annular plate or cap, and knocking out the wedges, a new tyre being then adapted to the wheel, and fastened by again driving in the wedges, the annular plate or cap being then again replaced.

[Printed, 8d. Drawing.]

A.D. 1862, July 30.—N° 2158.

GEDGE, WILLIAM EDWARD.—(*A communication from Louis Eugène Jamet and Paul Jamet.*)—"Improved means or apparatus for securing the safety of trains moving on railways."

According to one portion of this invention "three principal parts" are used, the first being an additional or safety rail, which is laid down on curves and other dangerous portions of the permanent way, between the ordinary rails, and elevated slightly above them; the second consisting of two friction rollers which turn or work horizontally, one on each side of the safety rail; and, thirdly, of two nipples, chimneys, or trivets which form bosses or naves to the axles of the friction rollers. The safety rail, near the extremities, and to permit the introduction of flanges upon the rollers, has its lateral faces brought nearer together than in other parts, "thus giving to the rail at its spring the shape of a wedge; or the upper shoulder may gradually die away. The safety rail starts before the curve begins, in order that the train may travel on it before the locomotive arrives at the curve, or it may be used along the whole line of railway (except at crossings) if found desirable." Different modifications of this part of the invention are described, in some cases two safety rails being used, and the bearings of the friction rollers being provided with springs.

According to another part of the invention no safety rail is used, but a modification is made in the ordinary rails by which the wheels of the carriage and the base or block of a certain safety

brake are made to rest upon a return provided with a shoulder, which fulfils the office of the safety rail mentioned above, this brake, aided by the friction rollers, effectually preventing the carriage from leaving the rails, even in case of the breakage of an axle.

The details of this invention are set forth at great length, such details being for the most part of such character that they will not be clearly understood without the aid of the Drawing annexed to the Specification, springs, latches, eccentrics, toothed wheels and sectors, and other mechanism being described in profusion, and also a spring "which drives off stones or snow" from the rails.

[Printed, 1s. Drawings.]

A.D. 1862, August 5.—N<sup>o</sup> 2202. (\* \*)

**PRIESTLEY, ABRAHAM.**—"Improvements in arrangements or apparatus applicable to locomotive railway engines and carriages, for distributing sand upon the rails, and give adhesion to the driving and brake wheels of such engines and carriages."

"The invention consists in the use of agitators and screws (or equivalent mechanism), which are placed in a box or hopper containing sand, which agitators and screws receive continuous motion when required from the axle or the periphery of the wheel of the engine or carriage," "so that the sand is uniformly delivered when required," and is "conducted down a pipe to the front of the wheels to which adhesion is to be given."

[Printed, 10d. Drawing.]

A.D. 1862, August 11.—N<sup>o</sup> 2243.

**AMIES, NATHANIEL JONES.**—"Improvements in the manufacture of bearings or steps employed in machinery, and railway and other carriages, and in a composition to be applied thereto."

This invention "is designed for the purpose of dispensing with brass and other expensive metals in the manufacture of 'steps' or 'bearings,'" and the invention consists in the substitution of malleable cast iron "for the exterior or case, and in filling the interior or parts subject to friction with any well-known non-metallic antifrictional composition, or with one consisting of caoutchouc, gutta percha, or other elastic gum incorporated

" with plumbago, steatite, or plastic earthy, or metallic matters  
" bound together atomically with vegetable or animal gums or  
" size, and in such proportions as, when dry, to form a hard and  
" solid filling for the aforesaid hollow case."

This composition "may also be used for bearings by itself," the chief feature thereof being the combination of the aforesaid ingredients or other equivalents, "to the entire exclusion of all  
" vegetable or animal fibres, such composition exciting less friction," and consequently being better adapted for steps or bearings "than when fibrous materials are combined therewith."

The patentee states that when "water or liquid in a heated state  
" has to come into contact with the composition," he prefers "to  
" employ a gum called 'rhus copallinus' (gum copal) which is  
" better calculated to resist the action of heated liquids."

[Printed, 4d. No Drawings.]

A.D. 1862, August 18.—N° 2316.

NEWTON, WILLIAM EDWARD. — (*A communication from Valentin Lasserre.*)—"Improvements in connecting plates, sheets,  
" or slabs of metal, or other materials, and fastening the same on  
" to framing applicable to armour plating for ships, or vessels, or  
" batteries, and to roofing and other similar purposes."

This invention is mentioned as being applicable, among other purposes, in the construction of railway carriages, but no special mode of so applying it is set forth. The essential feature of the invention consists in attaching metallic plates to framing of either metal or wood, by the use of screws or bolts fixed in or passing through the framing, such screws or bolts each passing through a hemispherical cap, "which is thereby screwed down tight on to  
" the plates, and forms a water-tight joint." The plates are provided at their points of junction with cup-formed projections fitting into each other, and also into the hemispherical caps, and the plates having been laid in position and the caps applied, the screws or bolts are passed through holes in the caps and plates, and through or into the framing. The head of the screw may be bevelled, as in the case of screws used commonly for timber work, in which case the head of the cap is tapped for the reception of a  
" screw cap," which hermetically closes the opening, or in the case of temporary coverings the cap may be covered with a sheet of thin metal, held in its place by a wire. Or the head of the screw or bolt may be square, with an annular recess for the recep-

tion of the head of the cap. Other minor modifications of the invention are mentioned as applicable to different purposes, one arrangement being mentioned in which rows of plates of glass or other material are placed alternately with rows of metal; this arrangement being more specially applicable to roofings. The plates may be of various forms, and be flanged if requisite, and such plates may be either plain or corrugated.

[Printed, *ed.* Drawing.]

A.D. 1862, August 27.—N<sup>o</sup> 2378.

MAYES, WILLIAM MILBANK.—(*Provisional protection only.*)  
—“An improvement in or addition to wheels, particularly applicable to the wheels of railway and other carriages.”

This invention consists in inserting into the naves of wheels, or into “a box or casing surrounding the axle or nave, a spiral spring or springs,” such spring or springs surrounding the axle, and thus “all shock or jar to the axle during the running of the wheels” being prevented.

[Printed, *ed.* No Drawings.]

A.D. 1862, August 29.—N<sup>o</sup> 2401.

OWEN, WILLIAM.—“Improvements in the manufacture of railway wheels and tyres, and in securing tyres to wheels.”

This invention consists, in the first place, in “making the centres for wheels of wrought iron, by welding the inner ends of the spokes between two washers, in such manner that plate rolled iron may be bent for the spokes in the usual or any other form.” The washers “are intended to receive the ends of the spokes,” and they are raised to a welding heat, but the spokes have only a very small portion of the inner ends heated, this being mentioned as an important feature in the arrangement, as preventing waste of metal, and enabling the operation of welding the washers to the whole of the spokes to be effected at one heat.

The invention consists, secondly, in forming spokes from plain bar iron, bent into a form approaching that of a triangle, there being added to the “rim part” a suitable piece of “channel iron,” to thicken and widen it, and the two being welded together. Such spokes may be connected to a nave formed of washers, as mentioned above, and by way of supporting the spokes the inner portions may be enveloped for some distance from the nave by sockets projecting from the latter.



Another part of the invention consists in forming the spokes of locomotive wheels from plain rolled iron having parallel sides, with a "taper strip" welded to one edge thereof.

Another part of the invention consists in forming the naves of locomotive and other wheels of an outer, and, if desired, an inner ring of wrought iron, the space between them being filled up with scraps or other pieces of iron, and the whole being united by welding. And the outer ring may have openings formed in it, through which the inner ends of the spokes may be inserted previous to the welding, this operation then uniting the whole together.

Another part of the invention consists in "stamping wheels in" dies, with hollow spokes and with naves partially hollow." Thus two pieces of "channel iron," having flanges at the edges, may be placed together and united so as to form a hollow spoke. And spokes may each have a flange formed at one end, and such end be inserted into a nave formed in two parts, and with suitable recesses for the reception of such flanges. The patentee mentions that in making wheels with bent spokes it has been customary to join such spokes together by welding in suitable pieces or gluts at their bends, this being done by hand, whereas he performs such operation in dies by the use of a suitable steam or other hammer or press or stamp. He also mentions that in applying washers to the ends of spokes in order to form the nave of a wheel it is not always necessary to indent such washers, as if the latter are sufficiently heated, and the ends of the spokes cold or only partially heated, the indentations will be formed by the spoke ends themselves.

Other parts of the invention consist in sawing or slitting the ends of spokes, and bending the two portions of the ends apart, a nave being formed to correspond therewith, and the whole being welded together. A nave may also be formed of one piece of metal, having a groove or indentation to receive the enlarged ends of spokes, and the nave be "knocked down over the spoke ends" in suitable dies."

Another part of the invention relates to the formation of tyres from piles composed of rings formed from bars, which may be composed of "puddled or first process iron," and brought into shape by hammering and rolling, the rings being united by welding, and a tyre blank thus produced, which is afterwards rolled to the required dimensions. Rings of different section may be thus



tion of the head of the cap. Other minor modifications of the invention are mentioned as applicable to different purposes, one arrangement being mentioned in which rows of plates of glass or other material are placed alternately with rows of metal; this arrangement being more specially applicable to roofings. The plates may be of various forms, and be flanged if requisite, and such plates may be either plain or corrugated.

[Printed, 8d. Drawing.]

A.D. 1862, August 27.—N° 2378.

MAYES, WILLIAM MILBANKE.—(*Provisional protection only.*)  
—“An improvement in or addition to wheels, particularly applicable to the wheels of railway and other carriages.”

This invention consists in inserting into the naves of wheels, or into “a box or casing surrounding the axle or nave, a spiral spring or springs,” such spring or springs surrounding the axle, and thus “all shock or jar to the axle during the running of the wheels” being prevented.

[Printed, 4d. No Drawings.]

A.D. 1862, August 29.—N° 2401.

OWEN, WILLIAM.—“Improvements in the manufacture of railway wheels and tyres, and in securing tyres to wheels.”

This invention consists, in the first place, in “making the centres for wheels of wrought iron, by welding the inner ends of the spokes between two washers, in such manner that the rolled iron may be bent for the spokes in the usual or any other form.” The washers “are intended to receive the ends of the spokes,” and they are raised to a welding heat, but the spokes have only a very small portion of the inner ends heated, this being mentioned as an important feature in the arrangement, as preventing waste of metal, and enabling the operation of welding the washers to the whole of the spokes to be effected at one heat.

The invention consists, secondly, in forming spokes from plain bar iron, bent into a form approaching that of a triangle, there being added to the “rim part” a suitable piece of “channel iron,” to thicken and widen it, and the two being welded together. Such spokes may be connected to a nave formed of washers, as mentioned above, and by way of supporting the spokes the inner portions may be enveloped for some distance from the nave by sockets projecting from the latter.

Another part of the invention consists in forming the spokes of locomotive wheels from plain rolled iron having parallel sides, with a "taper strip" welded to one edge thereof.

Another part of the invention consists in forming the naves of locomotive and other wheels of an outer, and, if desired, an inner ring of wrought iron, the space between them being filled up with scraps or other pieces of iron, and the whole being united by welding. And the outer ring may have openings formed in it, through which the inner ends of the spokes may be inserted previous to the welding, this operation then uniting the whole together.

Another part of the invention consists in "stamping wheels in" dies, with hollow spokes and with naves partially hollow." Thus two pieces of "channel iron," having flanges at the edges, may be placed together and united so as to form a hollow spoke. And spokes may each have a flange formed at one end, and such end be inserted into a nave formed in two parts, and with suitable recesses for the reception of such flanges. The patentee mentions that in making wheels with bent spokes it has been customary to join such spokes together by welding in suitable pieces or gluts at their bends, this being done by hand, whereas he performs such operation in dies by the use of a suitable steam or other hammer or press or stamp. He also mentions that in applying washers to the ends of spokes in order to form the nave of a wheel it is not always necessary to indent such washers, as if the latter are sufficiently heated, and the ends of the spokes cold or only partially heated, the indentations will be formed by the spoke ends themselves.

Other parts of the invention consist in sawing or slitting the ends of spokes, and bending the two portions of the ends apart, a nave being formed to correspond therewith, and the whole being welded together. A nave may also be formed of one piece of metal, having a groove or indentation to receive the enlarged ends of spokes, and the nave be "knocked down over the spoke ends" in suitable dies."

Another part of the invention relates to the formation of tyres from piles composed of rings formed from bars, which may be composed of "puddled or first process iron," and brought into shape by hammering and rolling, the rings being united by welding, and a tyre blank thus produced, which is afterwards rolled to the required dimensions. Rings of different section may be thus

united, and bars of steel be incorporated with bars of iron. Old tyres are contracted in size by rolling or other means, or by having a piece cut away and the ends thus left joined together; and they may also be strengthened by having pieces or rings welded to them.

Other parts of the invention consist in modes of attaching tyres to wheels, which include the application of dovetailed and other grooves with suitable projections entering therein, as also various tenons, mortices, washers, or rings, "lips" which may be "knocked down," keys, and rivets or bolts, some of the arrangements being applicable to the securing of tyres upon wooden wheels. These parts of the invention are illustrated by a Drawing containing a large number of figures, which it will be necessary to examine in order to understand the details of the arrangements set forth. The whole invention is described at great length.

[Printed, 4s. 2d. Drawings.]

A.D. 1862, September 5.—N<sup>o</sup> 2452.

**BOVILL, WILLIAM EDWARD.**—(*A communication from Louis Edouard Auguste Gobert.*)—"An improvement in the mode of applying oil and other fluid lubricating matters to machinery."

According to this invention an oil cup or reservoir is either formed or fixed under or at a lower level than the axle bearing or other article to which the lubricating material is to be applied. "A wick or pad, or several wicks or pads, or a combination of both possessing the property of capillary attraction, is inserted in the oil cup or reservoir, so that one end of the wick or pad shall touch the axle bearing or machinery to be lubricated, and the other end shall dip into and absorb the oil or other lubricating matter. The wick or pad is supported by a collar or case of wood, metal, leather, or any rigid substance, and is kept in its place, and in constant contact with the axle bearing or machinery to be lubricated, by a spring and guide or other mechanical contrivance. The wick or pad should be of such form and material that it may not be broken down or hollowed out by the movement of the machinery," so as to form a bed for the reception of dust and other impurities, and it should therefore "be made as narrow as feasible, and supported and stiffened by the collar or case;" arrangements being also made to prevent the oil from splashing. The oil cup is made with a

aloping bottom, and an aperture formed in the lower part, which is furnished with a screw plug, or other means of closing it, but when open permits the cup to be cleansed from dust and other impurities, which naturally will descend to the lower part of the sloping bottom, another aperture being formed in the cup, at a suitable height, for the introduction of the lubricating matter. And in order to utilize any superfluous lubricating matter which may be taken up from the wick or pad by the movement of the axle bearing or machinery, a conduit, or channel, or conduits or channels, is or are formed in the upper bearing of the axle box, leading from a hole or holes in such upper bearing to any part or parts of the axle bearing or machinery, so that when the matter which is taken up from the wick or pad rises and fills the holes it will flow through the conduit or channel or conduits or channels to the axle bearing or other machinery. A fusible plug, which may melt in case of the overheating of the parts, and so cause a flow of grease to the axle journal, is also described, but this forms no part of the invention claimed.

The invention is described by reference to a drawing annexed to the specification as applied to "railway axles."

[Printed, &c. Drawing.]

A.D. 1862, September 10.—N<sup>o</sup> 2485.

SAUNDERS, JONES.—"A new or improved railway break."

This invention relates to a break which is "continuous," and "to be made to act by the power of the locomotive," "requiring" "no fixing between the carriages," but being "ready to act upon" "the carriages, being screwed up together, as usual."

The patentee says:—"I fit a vertical lever or bar, which I call "a contact lever, on every buffer head by a pin through its mid-centre, on which pin the lever vibrates, and I fit each of these "contact levers at the lower end with a pulley, and at one or "both ends with contact pieces. At a suitable distance above "the buffer heads, on the bodies of the carriages, at the corners, "I fix by a joint one end of a vertical curved bar, which I call a "differential bar, which passes down behind and in contact with "the back of buffer head, and has fastened at its other end a "rope, which passes over the pulley of contact lever, and is "thence led to a bar hanging from the frame of the carriage, to "which hanging bar its other end is fastened. This hanging bar

“ carries the usual wooden blocks for pressing on to the periphery  
 “ of the wheel, with a spring interposed between the said blocks  
 “ and bar, and this arrangement being the same at both ends of  
 “ the carriage, I connect the hanging bars carrying the blocks by  
 “ rope, iron wire, or rods; thus each contact lever upon the  
 “ buffer heads of carriage is connected with its corresponding  
 “ contact lever on the same side of carriage. Thus if a number  
 “ of carriages are screwed up together in the usual way, it will  
 “ be seen that the contact levers on the buffer heads at one end  
 “ of a carriage will come in contact with the contact levers on  
 “ the buffer heads at the end of the other carriage screwed up to  
 “ it. It will be seen further that if the position of the front pair  
 “ of contact levers on front pair of buffer heads of first carriage  
 “ be altered from the vertical, all the contact levers must alter  
 “ accordingly; thus will be formed a continuous railway break  
 “ apparatus.”

The patentee proposes to work this apparatus by means of a roller mounted on the locomotive or the tender, and having a rope coiled upon it, at the middle of which is a bight or loop, which may be placed upon the hook of the first carriage, while the two ends of the rope are connected to the contact levers of that carriage, which, upon the turning of the roller, which may be effected through the medium of a worm wheel and a worm and winch, will move the contact levers of the first carriage, and through them those of the rest of the train. Other modes of bringing the apparatus into action may, however, be adopted, and the details of the invention be variously modified. Thus the contact levers may have pulleys at each end, by which means the “ contact pieces ” mentioned above may be dispensed with, and the hanging bars may have their lower ends so formed as to act as springs, thus ensuring uniform action of all the blocks. In order to “ release the pull of the locomotive without releasing the “ break,” a horizontal rod with a forked end, carried by the tender, may be screwed against the first pair of contact levers.

[Printed, 10d. Drawing.]

A.D. 1862, September 16.—No 2541. (\* \*)

**FLEXEN, STEPHEN.**—Improvements in ventilators for railway and other carriages.

To the ordinary gauze ventilator is attached a cord or band which passes over a pulley at the top of the door.



" In a groove or passage cut in the solid portion of the framework of the door or window, I enclose a metallic or any other rod, counterbalance, or weight, fastened or suspended to the aforesaid cord, band, or chain, which passes from the ventilator over a pulley or roller fixed in the upper part or head of the frame, or in the side thereof, if made to work horizontally. This rod or balance weight is guided by means of an eye so placed, by which it rises and falls, and thus allows the sash window or otherwise to be completely open or shut, or I use a catch knot or the like contrivance."

[Printed, 8d. Drawing.]

A.D. 1862, September 23.—N° 2596.

MICAS, JEANNE JARA NATHALIE.—" An improved railway brake."

In this invention there are fixed to the under framing of each railway carriage, and at the inner surface of the side timbers thereof, eight pieces of metal, opposite to each other, there being slots in the lower ends of these pieces in which slide long bolts or cross bars, to which are also connected diagonal brace bars, which are bolted to a rod extending lengthwise along the centre of the under framing of the carriage, each end of this rod being of globular form, and certain correspondingly formed coupling pieces being used to connect the rod of one carriage with that of another. " In making up a train, the aforesaid slotted pieces of metal are so fixed to the under framing of the railway carriage as to be equidistant from the centre of the axle of each pair of running wheels, say about three feet therefrom, and to the bolts in said slotted pieces a bent lever is connected loosely, and to the lower end of said bent lever a metal shoe or brake block is hinged. The upper surface of this shoe is formed of the same curvature as the periphery of the running wheels of the carriage, and the under surface of said shoe is formed flat, and with a side flange to embrace the surface and inner side of the rails when the brake is in action. The aforesaid bent lever is supported in proper position and out of contact with the wheel and rails by a rod, the upper end whereof works in a slot in a casting fixed to the side framing of the carriage. A curved bar of metal is also connected by its ends to the upper ends of the rods employed to support each pair of bent levers



" and their shoes or brake blocks. The aforesaid curved bar  
 " rests on the top of the axle box, and thus keeps the brake  
 " blocks from following with the carriage framing when the  
 " weight springs thereof are in action." The patentee proposes  
 to use " eight brake blocks, two to each wheel, at opposite parts,  
 " so that according to the direction in which the train is going,  
 " in like manner the brakes on that side will come into action,  
 " and force the opposite brakes out of action, and vice versa,"  
 the brakes being brought into operation by means of " toothed  
 " coupling links placed between the carriages, and a worm wheel  
 " fixed on a divided rod," which may be turned by a winch and  
 suitable apparatus in the guard's carriage; and being also so  
 connected with the buffing apparatus as to be brought into operation  
 on the carriages approaching too near each other. " The  
 " unwedging of the wheels is very readily effected," the brakes  
 being " driven forward by the weight of the carriages when the  
 " stoppage thereof has taken place."

[Printed, 1s. 4d. Drawings.]

A.D. 1862, September 23.—N° 2599.

LAURENT, SÉRAPHIN HONORÉ.—(*Provisional protection only.*)  
 —" An improved railway brake."

This invention relates to a " sliding railway brake for stopping  
 " trains almost instantaneously, whatever may be the speed at  
 " which they are running," such brake consisting of " clamps,  
 " which embrace and slide upon the rails."

" This apparatus is furnished with a screw, which is set in  
 " motion at the required moment by the guard or brakesman.  
 " The screw carries at its lower end a plate for carrying the  
 " different parts of the apparatus, the level of which is above the  
 " rails, to enable it to pass the crossings and junctions. A nut  
 " is placed on the screw before mentioned, which rises and falls  
 " on rotating the latter," this nut being " connected by means  
 " of toggle rods to the clamps for bearing on and exerting the  
 " lateral pressure on the rails," and the parts carrying the clamps  
 sliding one upon another " in such manner that the clamp on  
 " the inside of the one rail corresponds with the one on the out-  
 " side of the other rail, and vice versa." When not required to  
 act as a brake, the clamps, which are placed at the " back of the  
 " train," are kept in a raised position by means of a rack, but in

such a manner that they act as guides, and prevent the wheels of the train from leaving the rails, being let down when it is necessary to stop the train, and the screw applied as mentioned above.

[Printed, 4d. No Drawings.]

A.D. 1862, September 25.—N° 2622.

MUNTZ, EUGENE GUSTAVUS.—(*Provisional protection only.*)—"An improvement or improvements in the manufacture of "axles."

This invention consists "in employing cast and wrought iron "or steel in combination in the manufacture of axles." The inventor states that he takes for the arm or centre of the axle a bar or faggot of wrought iron or steel, around which he casts iron or steel, by which means he obtains the form of the axle "by casting, saving the labour of forging, whilst the wrought metal in "the centre affords the requisite tenacity."

[Printed, 4d. No Drawings.]

A.D. 1862, October 1.—N° 2657.

VAN DER BYL, PETER GERHARD.—(*A communication from Charles Bell.*)—"A power conserver brake for utilizing the power "expended in stopping or retarding machinery, locomotive or "other engines, and vehicles of any description when in "motion."

This invention is applicable to the engines and carriages used on railways, as also to vehicles for common roads, the arrangements being such that "the power which is expended by such "stopping or retarding is accumulated or stored up by the apparatus, and given out again by the same when it is required to "start the machines, engines, or vehicles again, so as to assist "them in their motion."

Different modes of carrying the invention into effect may be employed. Thus there may be placed upon one of the axles of a railway engine or carriage, or of a carriage suitable for travelling on common roads, two bevil wheels, facing each other, and revolving with the axle, but capable of being moved to and fro thereon, there being between these wheels a third wheel, mounted upon a shaft or spindle, which the patentee terms a brake spindle, the two wheels on the axle being moved into and out of gear with this wheel at pleasure by means of levers. To the brake spindle

may be attached one end of a strong volute or spiral spring, the other end of which is attached to the framing, the arrangement being such that upon placing one of the wheels on the axle into gear with that on the brake spindle, the latter will wind up the spring, the force required to wind up the spring serving to retard the motion of the engine or carriage, and if the other bevil wheel on the axle be now also brought into gear with that on the brake spindle the motion of the engine or carriage will wholly cease, no further rotation of the axle being possible. When it is desired that the carriage or engine shall again move forward, the first wheel on the axle is placed out of gear with that on the brake spindle, and the wound up spring, by its effort to unwind, will so act upon the brake spindle and the wheel thereon, and through the latter upon the second wheel upon the axle, as to aid in turning that axle and starting the engine or carriage. Instead of a spring, a drum may be placed upon the brake spindle, a cord or chain passing round this drum carrying a weight, which will be raised in stopping, and allowed to descend in again, starting the engine or carriage. Or the spindle may be connected by cranks or gearing to the rod of a piston placed in a cylinder containing air, steam, or other compressible and expansible gas or fluid; or a liquid may be caused to rise and fall in a pipe connected to such a cylinder; "or any other known contrivance may be employed" by which if the brake spindle revolves in one direction it "accumulates power, which power is capable of being afterwards" expended in causing the spindle to revolve in the reverse "direction."

In order to adapt the invention to vehicles which are provided with wheels running upon fixed axles, a bevil wheel is connected to one of such wheels, concentric therewith, and the brake spindle is furnished with two bevil wheels, one on each side of that on the wheel of the vehicle, and capable of being placed in and out of gear therewith, the same results being thus attained as in the first arrangement. Or instead of a bevil wheel being attached to one of the running wheels only, several of the latter may be so provided, and a corresponding number of brake spindles be used.

The details of the invention are described at some length, and as applicable not only to railway engines and vehicles and vehicles for common roads, but also to stationary steam engines. And the patentee mentions that in cases in which the engine or vehicle is meant to travel at a high speed, it may be desirable to use

"Robertson's grooved frictional gearing, instead of toothed wheels," the teeth of the latter being liable to fracture in such cases; or the bevil wheels may be brought into action through the medium of conical clutches, the wheels being constantly in gear, and those upon the axle being loose thereon.

[Printed, 1s. Drawings.]

A.D. 1862, October 9.—N<sup>o</sup> 2730.

SIMONS, GUSTAVE.—(*Provisional protection only.*)—"Improvements in the manufacture of plates, rods, axle tyres, and other articles that are required to be partly of iron and partly of steel."

The object of this invention is to manufacture articles composed partly of iron and partly of steel without welding one to the other, which the inventor mentions as being objectionable. He states that he has "attained this object by the application of the principle of partial cementation," by which means plates, bars, and other articles "may have one or more or all of their faces, or a part of the whole of their circumference steeled, the other faces or the interior of the articles not having been at all subjected to the carbonizing action." Articles thus made may be welded either to iron or steel, or be made hollow by boring out the interior portion of the iron.

Articles intended to be thus operated upon are in the first instance so prepared that the portion which is to be "cemented" is composed of fine grained iron, while the part which is to remain unchanged is of either a coarse grained iron or a fibrous iron, as may be thought most suitable. A mode of operating upon plates is described in which the plates are arranged in a furnace of which the bottom is in the first place covered with a bed of wood charcoal, upon which are placed the plates, having their fine grained portions in contact with the charcoal; "the bottom of the case is filled in this manner, leaving an interval of about half an inch between the sides of the plates," these spaces being then partially filled with wood charcoal, and the latter well beaten down, the whole being then covered with a layer composed of sand, clay, and iron scale; "a second row of plates is then placed, care being taken to place the cross grained iron upon the sand," the plates being again left partially uncovered, "the sand is also beaten down, and over the

" whole is placed a bed of wood charcoal of about half an inch  
" in depth; the first operation is then recommenced, and is  
" continued until the case is entirely full," the whole being  
covered with a thick bed of sand and clay, and the furnace  
hermetically closed, and heated.

" By operating in this manner the only part which is covered  
" into steel is that which is in contact with the charcoal, and that  
" only to the depth desired."

" In order to be able to judge of the degree of cementation  
" three or four iron-proof pieces of the same quality as those  
" placed in the furnace are used."

" If iron wheel tyres nearly completed are to be acted on the  
" exterior circumference is subjected to the cementing agent,  
" whilst the inner circumference, which is to be welded to the other  
" parts of the wheel, is protected from the action of the cement-  
" ing material in the same manner as before described, and will  
" thus remain in the state of iron, and the weld can therefore be  
" made in a complete manner." Steeled wheel tyres may also  
be made from piles or bundles, the plates of which have been  
subjected to the process above set forth, as also steeled plates and  
other articles.

The details of the invention may be varied, and different kinds  
of cementing agents used.

[Printed, 4d. No Drawings.]

A.D. 1862, October 15.—N<sup>o</sup> 2784.

PIRET, JEAN BAPTISTE GABRIEL MARIE FRÉDÉRIC.—"Im-  
" provements in lubricating apparatus."

This invention relates to an improved oil box, or that of any  
other liquid or lubricating apparatus for lubricating all kinds of  
axles, " and especially railway carriage axles."

The main features of the invention consist, firstly, in " a con-  
" tinual rise and spread of the liquid obtained from a lower  
" reservoir over the surface of the axle," these operations being  
effected by the use of a " helical wheel " connected to the end of  
the axle, which raises the lubricating material from the lower to  
an upper reservoir, from whence it flows down to the journal of  
the axle; this helical wheel consisting in fact of a disc, having  
around its circumference curved projections or cups, the form of  
which may be varied. Secondly, the invention consists of a per-

tition placed inside the box, and inclining forwards to prevent too great agitation of the lubricating material by the motion of the carriage. Thirdly, in an improved coupling or stuffing box fixed behind the journal, which prevents all lateral spread of the liquid from the box along the axle, this stuffing box being composed of two parts fitting one into the other, and receiving the packing in the interior; such box being placed on the exterior of the axle box, and bearing upon a leather collar placed between it and the rear face of the axle box, the stuffing box being held in position by means of a conical frame, certain clamps, and a bolt. Fourthly, the invention consists in the application of a guard plate for preventing the introduction of any foreign matter into the axle box.

The axle box is formed in two parts, which are connected together by strong bolts, the latter also serving to connect the box to the carriage, and is furnished with a screw plug, by the removal of which the box may be emptied and cleansed. The helical wheel turns in a circular recess formed in the front part of the axle box, and is secured upon the end of the axle by means of two rivets, having dovetail heads which are received in a groove of similar form, made longitudinally in the end of such axle.

[Printed, 1s. Drawings.]

A.D. 1862, October 18.—N° 2809.

WEBSTER, RICHARD.—(*Provisional protection only.*)—"Improvements in means or apparatus for preventing or mitigating accidents arising from collisions of railway trains."

This invention consists "in the application to each end of railway trains of a fender or projecting guide frame, which is formed with an incline or slope or at an angle to the rails, in such manner that when two trains come in collision, the said fenders or guides of each train will come in contact with each other, and the inclines thereof will cause the trains to be deflected or guided sideway from the rails, so as to pass each other, and thus avoid direct concussion, which is now the case when two trains come in collision."

[Printed, 4d. No Drawings.]

A.D. 1862, October 20.—N° 2821.

CLARK, JOHN.—"Improvements in the means of applying railway brakes."



According to this invention ordinary break blocks of wood or metal are suspended from the framing of each railway carriage, one or two blocks being applied to each wheel, and on one side or on both sides of the carriage, as may be requisite. On the lower part of each is mounted a grooved pulley, and a rope or chain is passed over or under or under and round these pulleys, the tightening of such rope or chain causing the blocks to be pressed against the wheels of the carriage, and the rope or chain of one carriage being connected to that of another so as to form a continuous length, extending from end to end of the train, having one end attached to a drum carried by the engine, the tender, or the guard's van, by turning which drum the rope or chain may be tightened, and the whole of the breaks of the train brought into action. This drum may be turned by hand, through the medium of suitable gearing connected therewith, but the patentee proposes to mount it in moveable bearings, and to fix upon its axis a wheel or wheels which may be brought when requisite into contact with the peripheries of the engine, tender, or carriage wheels, as the case may be, or into contact with the rails on which the train is travelling, rotation of the drum and tightening of the rope or chain being thus produced, this making "the momentum of the train the power for actuating the breaks," "The break power may be thus applied from one or both ends of the train simultaneously."

"When the break blocks are fitted at one side of the carriages only, the chain is run along outside of the wheels, or just inside, according as the pulleys are fixed. When the breaks are fitted to both sides of the carriage, the rope or chain may be duplicated and pass along both sides, or the blocks of the breaks may be connected by a transverse rib, and the chain run through the centre under the train; the pulleys in the latter case may be either mounted upon the cross rib or be made to actuate the same through suitable levers." The several break blocks "are so hung to the framing that they release themselves by gravity when the chains are slackened, and, when necessary, a spring is added to assist the relieving motion, or one or both may be used, as circumstances may require."

Various modifications of the invention are described, and illustrated by Drawings containing a large number of Figures. In one arrangement the winding drum is loose upon its axis, and is placed in connection therewith when necessary through the means

of conical or other collars, working upon feathers in the axis; and a small break drum is connected to the winding drum to prevent motion thereof when free from the axis.

[Printed, 1s. 4d. Drawings.]

A.D. 1862, October 28.—N° 2899.

FLETCHER, JOHN, senior, and FLETCHER, JOHN, junior.—*(Provisional protection only.)*—"Improvements in machinery for shaping iron and other metals."

This invention relates to the formation of the spokes of locomotive, waggon, and carriage wheels, as well as bolts and other articles, by the use of rollers suitably grooved and shaped, and to which an alternate or reciprocating axial motion is given by means of a rotating shaft and gearing, from which, through the medium of an adjustable stud or crank pin, an alternating motion is conveyed to a toothed quadrant in connection with the rolls.

For making the spokes of locomotive and other wheels, bars of proper thickness are cut into suitable lengths, and, after being heated, are passed through suitable grooves in the rollers, "either edgeways or flatways, or both, as the shape of the spoke may require, and the length of the reduced part may be determined by adjustable stops or gauges in each groove," and also by altering the throw of the crank pin. "The reduced part of the spoke can be rolled taper by forming the acting part of the rolls eccentrically, and by constructing the rolls with grooves to suit the particular shape of spoke required."

In forming bolts and other similar articles, rolls are used of different kinds, some having grooves suitable for forming the square part of the bolt, while others have grooves "alternately oval and round, so that after passing through the one, the bar is turned half round and passed through the next," other rollers, again, having grooves of varying depth for the purpose of reducing any part of the bolt which may require such reduction, the heads of the bolts being, however, formed in a "heading machine."

[Printed, 4d. No Drawings.]

A.D. 1862, October 29.—N° 2924.

FLETCHER, JOHN, senior, and FLETCHER, JOHN, junior.—*(Provisional protection only.)*—"Improvements in forming

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"wrought-iron wheels, and in the tools and apparatus for making the same."

According to this invention wrought-iron wheels are formed by making each spoke piece of such length that one part thereof may be bent over to form a portion of the circumference of the wheel frame, the ends of the pieces so bent, with certain angular filling pieces, being welded to the back parts of the spokes in front of them. The inner ends of the spokes are brought together to form the boss, wedge pieces being introduced between them, and there being grooves in the wedge pieces and also in the spokes, so arranged that when the parts are brought together these grooves form rivet holes. A washer is then laid upon each side of the intended boss, in which are corresponding rivet holes, rivets being then passed through these holes and the whole of the parts welded together. This welding is effected after the parts have been heated in a furnace, which is composed of an iron case or shell in which is built up a cylinder of fire-brick, or brick and fire-clay, of a size suitable for the wheels to be operated upon, this apparatus being furnished with a box-like projection for the introduction of fuel, placed at one side, and at the bottom an opening or cleansing hole; the hearth being rammed with ashes when fuel is about to be used, and tuyere holes being provided by means of which a blast of air may be driven into the furnace. The interior of the furnace is slightly larger in diameter than the boss of the wheel, and the latter is in the first place laid upon the top of the furnace and fire-brick or fire-clay placed between the arms to prevent the latter from being burned, a perforated cover being then placed over the furnace, and fuel being lighted in the lower part of the latter, the effect of the blast then causing the boss of the wheel to become highly heated. By the use of the box-like projection fuel can be so arranged as to be gradually ignited before it passes into the furnace, by which means the temperature of the furnace is not reduced on the introduction of fresh fuel. When the boss of the wheel is sufficiently heated the wheel is removed from the furnace and the welding process finished. For heating the parts at the circumference of a wheel previous to welding, a furnace of similar character may be used, the middle parts of the wheel being here protected by a cone of fire-brick, or an arched dome over the fuel; similar arrangements being also applicable to the heating of rings or wheel tyres.

For welding bosses the inventors employ "swages" composed of dies, which are so contrived that when placed in position and struck by a hammer they will form both the boss and a certain part of each of the spokes; this apparatus including a certain inverted cone, a wrought-iron ring, levers, wedges, and other mechanism for operating on the wheel and removing it from the machine when finished, all of which are fully set forth.

[Printed, 4s. No Drawings.]

A.D. 1862, October 31.—N<sup>o</sup> 2948.

GIBSON, THOMAS, HALL, THOMAS, and DAVISON, THOMAS.  
—"Improvements in railway breaks."

This invention relates to applying railway breaks when the speed of the engine is checked by the consequent "crowding" of the carriages of a train and the inward movement of the draw bars of the carriages or waggons composing such train.

According to one modification of the invention the breaks are fitted to arms attached to a transverse rocking shaft, the latter having near the middle a lever arm with a sliding piece thereon. " This sliding piece is kept extended so as to lengthen the arm " by means of a spring or otherwise, but is held up when the " break is not in action by the tail of a suspended lever or " equivalent device acted upon by the draw bar. Immediately " beneath the end of the sliding piece on the lever there is a boss " or collar made on the axle, and a notch or projection formed " thereon. So long as the tractive strain of the engine acts upon " the draw bars and keeps them drawn out, the sliding pieces " will be held up clear of the bosses or collars, but the moment " the steam is shut off and the speed of the engine is checked " the draw bars run in, and by moving the tail of the suspended " lever or equivalent device in the several carriages, allows the " sliding pieces to descend and drop into the notch, or in front " of the projection on the bosses, and being caught by them as " they rotate, causes the lever and rocking shaft to be partially " turned, and to apply the breaks. When the speed of the " engine is increased again, the extension of the draw bars lifts " the sliding pieces, and takes off the breaks again by the aid of " a spring for that purpose. The bosses or collars above referred " to may, if found desirable, form part of the nave or hub of the " wheel in place of being a separate boss on the axle."

According to another modification, a long horizontal break

lever is attached to a cross bar which connects two opposite breaks, so that by lifting such lever the breaks will be released, while by depressing it they will be applied to the wheels. This lever is operated upon either directly by a stud in the draw bar sliding along an inclined portion of the lever, or indirectly through the intervention of a suspended lever, the lower end of which carries a stud which acts upon the inclined part of the break lever. "When the break levers are not acted upon by the studs they are depressed by the action of powerful springs, which apply the requisite pressure to the breaks."

The patentee mentions that the whole or a portion only of the carriages of a train may be provided with this break-actuating mechanism, arranged in duplicate on each side of the framing of the carriages, the mechanism on one side being held out of action by inserting a pin in the draw bar "connected with that pair of breaks which are intended to operate only when the carriage is running in the opposite direction."

[Printed, 10d. Drawing.]

A.D. 1862, November 13.—N<sup>o</sup> 3063.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from Jean Antoine Lanzirotti and Paul Gemelli.*)—"An improved means or apparatus for shunting trains."

The object of this invention "is to enable a train to be shunted or moved from one line of rails to another without the aid of an attendant," and the invention consists "in fitting to the front or side of locomotives, tenders, or carriages, in front of a train, a projecting rod or rods which comes or come in contact with a weighted lever or levers at the side of the rail, which through the medium of rods or chains draw the points together and cause the course of the train to be diverted."

An arrangement is described in which the locomotive engine of a train is provided with several bars capable of sliding to and fro horizontally, one or other of these bars being made to project from the side of the engine when it is desired to shunt a train, and such bar coming into contact with a projection on a pillar mounted near the railway, and capable of turning upon its axis which is vertical. At the upper part of the pillar is an eccentric which, on the pillar being turned, acts upon a support on which a weighted point lever rests, the result being that the lever is allowed to fall into a certain position, and by means of a cam

link and a chain or rod moves the points. As soon as the rod upon the engine ceases to act upon the projection upon the pillar the latter is caused by means of a weight or spring to return to its original position. The point lever may either be restored to its first position by hand or by means of a chain and certain levers connected to a slide, which may be acted upon by a "projecting spur" fitted the back of the last carriage of the train, this apparatus being moved into a certain position by the falling of the point lever, and restored to its first position by the projecting spur.

[Printed, 8d. Drawing.]

A.D. 1862, November 18.—No 3096.

HOUGHTON, EDWARD PIERCE.—"An improved method of applying breaks or apparatus for stopping or retarding railway carriages."

According to this invention the carriages of a railway train are all provided with break blocks of the usual character, these being connected by means of rods, or otherwise, by levers mounted upon transverse rocking shafts, there being also on these rocking shafts other levers, projecting upwards and downwards therefrom, and there being passed through openings in the upper and lower ends of these levers "draw rods" furnished with spiral springs and collars, through the medium of which, on the movement of the bars to and fro, the break blocks are either pressed against or removed from the wheels of the train. The draw bars of one carriage are connected with those of another by suitable coupling chains, so that an upper and a lower line of bars and chains are formed throughout the train, the upper line only, however, being connected to the engine, and the lower one only to the last carriage or van of the train, which is so formed as to act as a break carriage. The chain connecting the upper draw rods to the engine is slack during the ordinary working of the train, another connection being made between the first carriage and the engine by means of a "differential draw chain" upon which the power of the engine is exerted in drawing the train, this differential chain being capable of being lengthened or shortened at pleasure, by the ends thereof being connected to "winch barrels," one of which is carried by the engine, and the other by the first carriage of the train. The tightening of this chain, so as to slacken the



chain connected to the upper draw rods, leaves the breaks free, but by unwinding a portion of this chain from one or both of the barrels, the power of the engine is made to exert itself upon the train through the medium of the chain attached to such upper draw rods, and these being thus dragged forward bring the breaks into action upon the wheels. In addition to this part of the arrangement the last carriage or van of the train, which, as already observed, is connected to the lower line of draw rods, is also connected to the carriage next in front of it by a tow line or chain, which, by means of a capstan placed in the van, can be tightened or slackened at pleasure. When tightened, the chain connecting this carriage or van with the lower draw rods is slack, but on releasing a certain catch, which during the regular working of the train holds the capstan in position, the barrel of the latter is allowed to turn round, causing the carriage or van containing it to recede from the rest of the train, and a pinion on the spindle of the capstan acting upon a rack connected to a break bar below the van, and, through that, upon the lower line of draw rods, thus increasing the effect being produced on the breaks. And this effect is still further increased by the construction of the van, the body of which is so mounted upon levers as to move forward and downward when the tow line is slackened, and so press upon the wheels, thus creating a drag upon the lower line of draw bars. The van contains two capstans, either of which may have the towing line connected to it, and the other may, if desired, be used to operate the breaks of the van by hand.

Different modifications of the invention may be employed, in some cases one line of draw rods only being used, with "double-action" breaks. The details of the invention are set forth at some length.

[Printed, *ls.* Drawings.]

A.D 1862, November 29.—N<sup>o</sup> 3202.

LLOYD, THOMAS.—(*Provisional protection only.*)—"Improvements in and applicable to the wheel of vehicles."

This invention relates to rendering the wheels of vehicles suitable for use either on railways, tramways, or common roads, the object being to produce "a simple self-acting arrangement of parts, unlikely to get out of order," capable of thoroughly guiding the wheels of a railway or other carriage when running on rails or trams, "and offering a minimum of resistance when

" used on common roads, and when moving or passing on " to or off from the rails or trams." The wheels may be formed either with discs or spokes, and with flat or otherwise formed tyres to suit the shape of the trams or rails; the main feature of the invention consisting in furnishing one side of each wheel with guiding pieces of metal or other material, which are slotted and placed upon stops or studs attached to the disc or spokes of the wheel, being capable of sliding to and fro upon such stops or studs in such manner that their outer ends may either project beyond the tyre of the wheel and so form a flange thereto, or be withdrawn so as not to project beyond such tyre. These sliding pieces are sufficient in number, and are placed sufficiently near together to cause their outer ends to come close or near to each other when projected, but they do not overlap and are not connected together. The result of the arrangement is that when the wheel is travelling upon a rail those of the guiding pieces which are on the parts of the wheel for the time being next the rail will fall by their own gravity until their ends project and form a flange, while the pieces on the parts of the wheel furthest from the rail will fall towards the axle. When the vehicle is running upon a common road the guiding pieces do not come into action as flanges, the flat surface of the road constantly pressing them backwards and not allowing them to project beyond the wheel. Springs may be applied to aid in drawing the pieces towards the axle, which springs will also prevent vibration of the parts.

[Printed, 4d. No Drawings.]

A.D. 1862, November 29.—N° 3209. (\* \*)

ANDERSON, JOHN.—"Improvements in the manufacture of " the tyres of railway wheels, and rails, switches, and crossings " of railways."

This invention consists in causing them " when made of steel, " or carbonized iron," to be heated to a "good or bright red heat, " and then quenched or cooled by immersion in oil. By this " means the quality of the metal of which the railway tyres, " rails, switches, and crossings are composed, will be greatly " changed in character, and at the same time rendered more " suitable for use."

[Printed, 4d. No Drawings.]

A.D. 1862, December 5.—N° 3263.

**WILSON, EDWARD BROWN.**—"Improvements in railway wheels, and in the mode of manufacturing the same."

According to this invention "two discs of the desired size are first prepared by casting in malleable metal, and are then placed in dies and subjected to compression or hammering therein, for the purpose of giving them the desired form, whether flat, dished, or corrugated. These dies are also so shaped as to produce a raised annular rim all round or partly round the circumference of the discs on one side thereof, such rim being either parallel, V-shaped, or of any other sectional form. The tire has corresponding annular grooves formed inside it, so as to fit accurately over or into the rims of the two discs, which are placed inside the tire from opposite sides thereof, and may or may not be held therein by bolts passing through the discs. The space between the discs may be filled in with india-rubber, cork wood, or other good sound deadening material." If desired the discs may be of cast steel, and in subjecting the discs, whether of cast steel or malleable metal, to the pressure of the dies the patentee uses, by preference, the press for which a Patent was granted to him on the 19th of December, 1862, No. 3398.

The patentee states that by these arrangements "greater economy and simplicity of construction are combined with increased safety in cases of fracture of the tire."

[Printed, &c. Drawing.]

A.D. 1862, December 6.—N° 3279.

**DONOVAN, RICHARD EDWARD.**—"Improvements in the means and apparatus for the prevention of railway accidents."

This invention consists in so arranging a plate or body, or a series of plates or bodies, of metal, wood, or other suitable material, in conjunction with a moveable bar, or moveable bars, all connected to the carriages, trucks, or engines of railway trains, that on a collision taking place such moveable bar or bars will act upon and break, bend, or perforate the plate or body, or series of plates or bodies, and thus more or less gradually expend the force of concussion before actual contact between the engines or carriages subjected to the collision takes place.

Different modifications of the invention are described, in some cases a moveable bar, furnished with a buffer head, being so arranged as in the event of collision to be driven inwards, its inner end bending, breaking, or perforating one or more of a number of plates mounted in framework behind it. In other cases the buffer head is mounted at the end of a sliding frame, having across it plates, bars, or short ropes, which in the event of collision are bent or broken by being driven against a strong stud. In another case a moveable bar is provided with a rack, which, on the bar being driven inwards, turns round a toothed wheel, the latter being connected to a drum around which are fixed plates or bars, which, on the rotation of the drum with the wheel are brought into contact with a fixed stud or stop. And in another case the moveable bar is jointed to two arms, connected to sockets which are placed some distance apart upon a bar on which they are capable of sliding, ropes or chains of different lengths passing from one socket to another, and being ruptured in succession by the sockets being driven asunder by the bar in the event of a collision. If desired the moveable bar may be combined with the ordinary buffer rods.

[Printed, 8d. Drawing.]

A.D. 1862, December 8.—N° 3291.

HILLIAR, JOHN.—“Improvements in ventilating, and in the “ exclusion of dust or draught, insects, or other animals from “ apartments, carriages, or other confined spaces.”

According to one modification of this invention a sheet of wire gauze is attached to a tube or case within which is a coiled spring, a rod passing through both spring and tube, and the spring being attached at one end to the rod and at the other to the tube, the result being that when the parts are at liberty the spring turns the tube round the rod, which is fixed, and coils the wire gauze upon the tube. The rod is fixed in any requisite situation by means of plates or brackets, these carrying also an outer case or covering for the protection of the gauze. To the lower edge of the latter is attached a beading or rod, and to this is connected a hinge or other suitable apparatus, which may form a connection between the beading or rod and the upper part of the sliding window of a railway or other carriage (for example), or of the sliding sash of a window, or any other moveable article “ that may need to ex-

"clude the air or fill up the space of the ventilator when out of use." The result of the arrangement is that on the sliding window of a railway or other carriage being depressed, the wire gauze is drawn down over the opening thus left in the door, excluding dust or insects, while still allowing the access of sufficient air for the purposes of ventilation, the same result following the adaptation of the invention to the window of a dwelling house, or to any other article which it may be desired from time to time to remove for purposes of ventilation. The sides of the gauze may be furnished with strips of india-rubber or other flexible material, which may work in grooves or tubes provided for them at the sides of the window frame or other opening, these preserving the gauze in due position, and preventing the access of dust or insects at such sides. The invention may be variously modified, several sheets of gauze being in some cases placed upon one tube, or roller; or, "for the nicer gradation of ventilation," two or more tubes or rollers carrying sheets of gauze may be used, and may be either brought into action separately or together, certain looped cords being employed to regulate the position of the different sheets as requisite. The invention is described as being applicable, among other purposes, to enclosing the sides and other parts of bedsteads, thus excluding therefrom insects and reptiles.

[Printed, 10d. Drawing.]

A.D. 1862, December 15.—N<sup>o</sup> 3351.

WILSON, EDWARD BROWN.—(*Provisional protection only.*)—"Improvements in machinery or apparatus for rolling metals."

This invention relates to "a peculiar construction and arrangement of conical rolling mill, and consists in driving one roll direct from the main shaft by suitable gearing, the other roll being driven direct from the first roll by intermediate gearing, or it may be found that the pressure applied to the rollers will be sufficient to drive the second roll, in which case the intermediate gearing may be dispensed with. One of the rolls is adjusted either by screw, or cam, or hydraulic power.

The inventor mentions that in rolling tyres, as also hoops and other similar articles, he places a guide roller, or guide rollers, "in the plane of motion" in order to keep such tyres or other articles "perfectly circular."

[Printed, 4d. No Drawings.]

A.D. 1862, December 15.—N° 3352.

KIRK, ROBERT.—(*Provisional protection only.*)—"Improvements  
" in machinery or apparatus for checking or stopping the motion  
" of railway carriages."

Under one modification of this invention "the axles of each  
" carriage are formed with a small crank at the central part.  
" These cranks are made by preference about half an inch to  
" an inch in depth, and each crank is connected to the conti-  
" guous axle by a connecting rod, which rises and falls with the  
" rotatory motion of the axles to an extent corresponding to the  
" depth of the cranks. Above each connecting rod is fitted, in  
" the framing of the carriage or other suitable part, a wheel, a  
" portion of the periphery of which is removed so as to form a  
" flattened surface. This flattened part of the wheel is, under  
" ordinary circumstances, or when the apparatus is not in use,  
" immediately over the connecting rod, and so that the rod in  
" its reciprocating motion just clears the under surface of the  
" wheel. The spindle to which the wheel is fast extends out-  
" wards in a lateral direction sufficiently far to admit of the  
" convenient attachment thereto of a small vertical lever. These  
" small levers throughout the train of carriages are each con-  
" nected by means of chains or other suitable couplings one to  
" the other, the two end extremities being connected to hand  
" levers, which are respectively within convenient reach of the  
" engine driver at the head of the train, and of the guard in the  
" rear. With this arrangement of apparatus, when the train is  
" proceeding safely the chains hold the several wheels securely  
" in position, with the flattened parts above the connecting rods,  
" but when it becomes necessary to stop the train quickly the  
" engineer or the guard slackens the chains by means of the  
" hand lever, which admits of the wheels turning to a slight  
" extent, and their peripheries act as so many wedges, and fix  
" tightly the wheels of the several carriages, which are thus  
" simultaneously held fast, and the train is very quickly brought  
" to a stand still."

This arrangement may be variously modified. For instance,  
" a powerful screw clip may be used for the purpose of nipping  
" the connecting rod of each pair of axles, or in lieu of this a  
" chain may be used for connecting the cranks, and by causing  
" this to be wound more or less upon a laterally extending



" shaft the necessary pressure may be brought to bear upon  
" the crauked axles, so as to stop quickly the rotation of the  
" wheels."

[Printed, 4d. No Drawings.]

A.D. 1862, December 19.—N<sup>o</sup> 3397.

LONGRIDGE, WILLIAM SMITH.—" Improvements in ma-  
" chinery for rolling tyres, hoops, and rings."

This invention relates to the manufacture of the tyres of rail-  
way and other wheels, and of sheets or plates for boilers and other  
purposes. In the machinery the upper roll is mounted in the  
usual manner, the lower roll being so mounted " that when the  
" tyres, hoops, or rings are passed into or removed from the  
" machines they are passed between the end of the lower roll  
" and the side frame which carries the bearing of the roll."

One end of the lower roll is so arranged as not to reach into or  
up to the side standard of the machine, a space being left between  
them sufficient to allow the bloom for the tyre, hoop, or ring to  
be passed into such space, and inserted between the upper and  
lower rolls or removed therefrom. The bearing which carries the  
end of the lower roll is mounted upon a moveable carriage, so as  
to be capable of being traversed backwards away from the roll  
when the bloom is introduced, and then returned thereto, this  
traversing being effected by the use of a hydraulic ram or other  
suitable means, and the upper roll being raised during the intro-  
duction of the bloom. When hoops or rings of greater width  
than the interval of space between the end of the roll and the  
frame are required, the machine is so constructed that the lower  
roll itself may be traversed longitudinally in order to admit of the  
passage of such hoops or rings to and from the rolls, the opposite  
end of the roll to that already mentioned being mounted in bear-  
ings placed upon a moveable carriage which may be traversed to  
and fro by the use of hydraulic apparatus.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, December 23.—N<sup>o</sup> 3428.

WHITLEY, JOSEPH and BURTON, JOHN WATSON.—" Im-  
" provements in the construction of the permanent way of  
" railways, which improvements are also applicable to railway  
" wheels."

As regards the improvements in the permanent way of railways the invention consists "in the application of a packing or cushion " of wood, paper, or felt, between the connecting plates or fishes " for connecting the rails together and the rails." These cushions may be compressed and chemically prepared, as is well understood, "to aid in their preservation from the action of damp." The invention is described as being also applicable to railway wheels having metallic disc sides, the cushion being in such cases inserted between the metallic discs, and the parts by which they are connected with the rims and bosses.

The wood or other material employed as a cushion may be saturated with oil or other preservative matter, and the patentee states that by the expansive force of the cushion acting against the bolts which hold the parts together such bolts are kept tight, and the friction created by two iron surfaces being in contact will be obviated.

[Printed, 6d. Drawing.]

A.D. 1862, December 31.—N<sup>o</sup> 3486.

CLARK, WILLIAM.—(*A communication from Jean Jacques Meyer and Adolphe Meyer.*)—(*Provisional protection only.*)—"Improvements in the arrangement of the parts of railway trains, and in " the application of power for their propulsion."

This invention has for its object to overcome the difficulties which arise when it becomes necessary to form lines of railway with steep gradients and sharp curves, without resorting to the use of short trains, or of trains with engines at each end.

The invention relates to an improved locomotive train, which, " while possessing an adherence proportionate to the largest requirements, does not possess the inconvenience of employing " two engines, nor require the same expense; one train possessing " the same stability throughout in a straight line, may be run " upon the steepest branch lines, and which, instead of breaking " the tyres and destroying the road, will not exceed 4 or 5 tons " per wheel (8 to 10 tons per axle), and so permit of using lighter " rails in the construction of railways sufficient to bear the weight " of the carriage wheels, and which rails may thus be made " longer," these two conditions diminishing the first cost of constructing railways.

The invention "is based on the employment of several sets of " driving wheels, which are individually rigid, but connected

"together so as to form a flexible train. Their number depends on the power of adhesion desired, or on the curves of the rail-road, or the weight disposed on each wheel."

The "points of difference between this improved system and those of similar construction hitherto adopted," are set forth at great length, and divided into twenty-eight heads. The improved system embraces "several independent arrangements of driving wheels in one train," such wheels "being drivers and not running wheels." The trucks are connected by draw bars, pivots, hooks, and coupling chains. Each truck has its own driving mechanism, and the wheels may work independent of each other, in order to facilitate passing round curves. One steam generator only is used to each train of trucks, jointed or elastic tubes conveying steam therefrom to the driving apparatus of the different trucks, and several modes of supporting and arranging the boiler are mentioned, the boiler having no special framing, but being carried by the trucks, and connected to them by jointed bearings. Other arrangements are mentioned with reference to the furnace, the crank axles and cranks, the tanks for water and fuel, and other details which do not belong to the subject of the present series of abridgments. Any kind of brake may be employed, "one acting directly on the rails" being preferred, and the speed of a train may also be regulated by varying the supply of steam to the cylinders of the driving apparatus.

[Printed, 4d. No Drawings.]

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A.D. 1863, January 3.—N<sup>o</sup> 25.

PHILIPPI, WILLIAM.—"Improvements in the manufacture of bearings and axle boxes for machinery, carriages, and railway rolling stock."

This invention consists in forming in the bearing and axle boxes of railway rolling stock and other machinery certain spaces, which spaces are then filled up with a composition, consisting of paper, linseed oil, graphite, and gypsum, these ingredients being pressed into a homogeneous mass, and so much of the mixture being placed in each of the spaces "as is necessary to fill the same under a pressure of three atmospheres."

The proportions in which these ingredients are used may be varied, but the patentee mentions a compound as consisting of ten pounds of paper, six pounds of linseed oil, three pounds of graphite, and three pounds of gypsum; the bearing or axle box, after the mixture is placed in the spaces, being brought into the proper form by the use of "a turned iron cylinder, having "the form of the axis which is to work in the bearing," the latter, after the pressure is given, being placed "for 24 hours "in a temperature of 150 degrees 'Reaumur.'" Instead of linseed oil, any other drying oil, glue, or gum, may be used. Instead of paper, broken up cotton, linen, hemp, or wood, and instead of the graphite, talc, arsenic, or oxyde of lead, these ingredients not, however, producing so good an effect as those first mentioned.

[Printed, 8d. Drawing.]

A.D. 1863, January 15.—N<sup>o</sup> 137.

**BATH, JAMES PARKER.**—"Improvements applicable to omnibuses and other like carriages, to adapt them for use on rail or "tram roads, as well as common highways."

This invention consists in jointing to the under side of the fore carriage of an omnibus or other like vehicle two short pendulous arms, these arms carrying at their lower ends axles or supports furnished with circular discs or wheels, the latter being just inside the wheels of the omnibus or other vehicle, and when the wheels of the latter are running upon a railway, projecting for a short distance below them, and acting as guides or flanges to keep the wheels upon the rails. When the guides are thus used they are held in position by india-rubber or other springs, attached to each side of the pendulous arms, and to the ends of cross-beams or arms fixed to receive them. These springs are sufficiently strong to keep the arms and guides in position under ordinary circumstances, but are so arranged as to give way should the guides come in contact with an obstruction, and allow them to pass backwards and upwards until they have passed over such obstruction. And when it is desired to travel upon a common road the guide wheels are raised out of action by means of a bridle chain connected to the pendulous arms, and passing over a pulley carried by a short lever which is connected by a link to a horizontal screwed rod, capable of being turned by a hand wheel;

a certain rod and clip being used to lock and unlock the fore carriage when travelling on rails.

[Printed, 8d. Drawing.]

A.D. 1863, January 16.—N° 144.

KERR, JOHN.—(*Provisional protection only.*)—"Certain improvements in the means of retarding or stopping railway and other carriages."

These improvements, as applied to railway carriages, consist in connecting the ordinary buffer apparatus (consisting of buffers, rods, and draw springs) with the levers actuating the breaks by means of levers, links, or other equivalent connections, "so that when the speed of the engine is slackened the concussion or pressure of the buffers of the carriages behind shall compress the springs, transfer the impetus of the carriages to the breaks, and so stop the carriages."

The improvements may also be applied to "carts or carriages on common roads, by connecting the straps, poles, or shafts by which the animal of draught retards the vehicle to breaks acting upon the wheels."

[Printed, 4d. No Drawings.]

A.D. 1863, January 20.—N° 172.

HENRY, MICHAEL.—(*A communication from Charles Fray, Vincent Paul Amédée Varenne, Louis Casimir Descouleur, and Sabin Joseph Cazier.*)—(*Provisional protection only.*)—"Improvements in apparatus for retarding and stopping railway carriages."

In this invention the apparatus for working the breaks of railway carriages is so combined with apparatus for connecting or coupling the carriages that the breaks are applied by the action of uncoupling or disconnecting the carriages from each other. According to one arrangement this is effected by means of a chain or like agent which may be easily acted upon by an attendant, and which is connected under each carriage to a rod or shaft called the disconnecting shaft. Each coupling hook is held to the carriage by a piece called a key, kept in place by a notched or hooked piece, connected to the disconnecting shaft by a crank, link, or jointed lever. By pulling at the chain the

disconnecting shaft is so moved as to release the notched or hooked piece from the key, the latter being then so acted upon by a spring as to liberate the coupling hook from the carriage. The movement of the disconnecting shaft also causes a certain arm and other apparatus to bring into operation certain clutch boxes or collars on the carriage axle. One of these boxes or collars carries a pinion or wheel, and this, through the medium of other pinions, chains, and endless screw or other gearing works a pinion on a "threaded axle," which is thus made to move upwards, and through the medium of certain links and bell cranks, and a rod connected to the breaks, to apply the latter to the wheels of the carriage.

If desired the break shaft may carry two breaks for each wheel, these acting on opposite sides of the latter, one being a friction break or block, and the other a biting or clutch break, "that is, a hollow block, which may act as a shoe or skid, and embrace half the wheel's periphery. The wheel may thus be simultaneously locked and skidded." The breaks, when released from the wheels, are restored to their original positions by springs. The break shaft may be carried by supports capable of sliding up and down in slots in the axle guards, the breaks thus accommodating themselves "to the movement or position of the wheel to suit the lading of the carriage."

Instead of working the break blocks by the disconnecting action the threaded axis may be worked by a hand wheel or other equivalent contrivance.

[Printed, 4d. No Drawings.]

A.D. 1863, January 26.—N° 227.

FELL, JOHN BARRACLOUGH.—"Improvements in working railway engines and carriages on steep inclines."

In this invention the patentee applies to the engines and carriages of railway trains "wheels in pairs or sets of two or more, so arranged as to work on either side of a central rail, and to press and hold on such rail with a pressure and holding adapted to the circumstances of each case. In travelling up inclines the wheels of each pair or set are worked by the engine at a speed and with a pressure on each side of the central rail according to the load and the rate at which the engine has to travel, and the adhesion necessary for taking the load up the



"incline. In descending the inclines these pairs of wheels on the engine and carriages are employed as breaks, with an adhesion adapted to the load. These pairs of wheels also hold on either side of the central rail, in such a manner as to afford a great amount of security against the wheels of the engines or carriages jumping and getting off the lines of rails on which they are travelling."

The details of the invention may be varied, but one arrangement is described in which a locomotive engine is provided with four wheels, which are mounted horizontally under the carriage, and pressed against a central rail by means of springs and a screw, the turning of the latter regulating the pressure of the wheels against the rail. These wheels are in this case driven by means of supplementary cylinders and pistons arranged for the purpose, and when descending an incline the direction of motion of this apparatus may be reversed, which will cause the wheels to act as breaks. In other cases volute springs and eccentrics are used to regulate the pressure of the wheels against the central rail. The horizontal wheels applied to the tender and the carriages of the train may be driven by means of suitable cranks and coupling rods. The central rail projects on each side at the top so as to admit of flanges on the horizontal wheels working below such projections. Or the wheels may enter recesses in the rails; or such wheels may be grooved for the reception of projecting parts of the rail, these arrangements preventing the engine and carriages from rising up and so leaving the rails. "The pressure of steam in the boiler may also be employed for producing the requisite amount of adhesion between the horizontal wheels and the central rail; or it may be applied by hand."

[Printed, 1s. 6d. Drawings.]

A.D. 1863, January 30.—No 282.

NEWTON, WILLIAM EDWARD.—(*A communication from George Collyer.*)—"Improvements in the couplings for railway carriages"

The object of this invention is to "construct couplings in such a manner that they may be readily detached without the necessity of moving the train either backward or forward." And this is effected "by the employment of spring catches placed within the coupling boxes, and which catches retain and hold

" back the draw rod or bar, which is provided at each end with  
 " an inclined projecting piece, so that when the end of the rod is  
 " inserted it will lift up the spring catch and pass under." These catches work in vertical grooves, and the stem of each catch passes through the top of the box, and is provided with a ring or hook by which the catch may be drawn up when it is desired to release the draw bar. Swells or protuberances are made on the sides of the bar, near its ends, so that should the carriage be thrown off the rails the deviation of the draw bar from a straight line will cause the swells or protuberances to lift the catch and release the bar. The rear of the coupling box is provided with a rod, which passes into another box and acts upon a draw spring made of vulcanized india-rubber, the latter being capable of compression in either direction, "that is, whether the  
 " carriage be drawn forward or pushed backward."

The details of the invention are minutely set forth.

[Printed, 10d. Drawing.]

A.D. 1863, February 4.—N<sup>o</sup> 318.

WESTON, WILLIAM THOMAS.—"An improved spring catch  
 " or fastening, applicable to windows and other useful pur-  
 " poses."

This invention relates to a spring catch or fastening which may be applied not only to windows, but also to railway signals, railway breaks, and other purposes.

According to one arrangement a box plate contains a curved steel spring, extending nearly from end to end of the box, and also a hollow or channelled lever containing a flat spring, one end of which is fastened to the fulcrum end of the lever by means of a small vertical pin or stud, and also by means of a cross pin, passing through each side of the lever and underneath the flat spring close to the fulcrum end, "to bear pressure and create an  
 " increased elasticity or power in the spring." The latter is furnished on its upper surface, and near the opposite end of the lever, with a wedge or angular shaped stud or tooth, which projects through an aperture in the lever and forms a catch or stop, which takes into a series of corresponding cavities or racks, formed either underneath or at the side or sides of a segmental plate which is placed above the lever, one end of such plate being secured to an ordinary plate containing holes for screws, by which it may be attached to the window or other object to which the

fastening is to be applied. Or the rack may be formed upon the plate itself, "in which case the position of the spring catch " within the lever would merely have to be reversed."

In some cases a spiral spring may be substituted for the flat spring in the hollow of the lever, "the object being to move the " catch or stop horizontally against the rack when formed on the " side or sides of the segmental plate." The lever is applied to the box and spring by means of a pin or stud passing through holes cut in both the upper and lower surfaces of the box, and through a hole in the fulcrum end of the lever, which end is lengthened, and bears against the central portion of the curvilinear spring, and holds the same in position in the box without any other fastening. The fulcrum end of this lever is somewhat enlarged, in order to exercise greater pressure upon the spring by the action or movement of the lever.

In order to unlock the catch, the spring is to be depressed by means of a vertical stud, piston, or handle, inserted into the end of the lever, the lower part of such stud, piston, or handle, having a horizontal slot therein, into which the tip of the spring enters.

These arrangements may be variously modified. Thus the flat spring in the hollow of the lever may be dispensed with, and the tooth made a fixture on the lever. Or the lever may be used without a tooth, and the segmental plate have jointed to it a lever furnished with teeth, which will form a rack for the fastening lever to "pass under," such lever being pressed upon, if necessary, by a spring.

The patentee states that railway breaks "may be worked by a " slight modification of the same principles," but he does not set forth any special application of the invention thereto.

[Printed, 6d. Drawing.]

A.D. 1863, February 12.—N<sup>o</sup> 382.

CLARK, WILLIAM.—(*A communication from Nicolas Bailly and Charles Durand.*)—(*Provisional protection only.*)—"Improvements " in the bearing surfaces of shafts and other axes."

This invention relates to "the application of hard metal spheres " for transmitting the load weight of journals and shafts. These " spheres are contained in a suitable box, and the journal, in its " rotation, produces a rolling movement in the whole o the

“ spheres, thus creating a rolling friction in lieu of the ordinary sliding or rubbing friction of journals and their shafts in bearings.”

An arrangement is described in which the axle box contains three series or rows of spheres or balls, the two outer rows being composed of balls of about two inches in diameter, those of the central row being about one inch and a half in diameter; the journal of the axle being grooved for the reception of the larger balls, and the smaller and central balls working upon a concave ring surrounding the axle without touching it, the smaller balls being for the purpose of keeping the larger balls at a proper distance apart. The latter are surrounded by concave rings which keep them in their places, these rings being only attached to the box for a portion of their length, and serving therefore partly as springs, thus more efficiently guiding the balls. The details of the invention may be varied, in some cases the smaller balls working “behind” the larger balls, and the ring for the reception of the smaller balls being dispensed with.

[Printed, 8d. Drawing.]

A.D. 1863, February 18.—N° 440.

**SIÉGRIST, MICHEL.**—(*Provisional protection only.*)—“ An improved atmospheric brake or break.”

According to this invention two metal bars are fixed horizontally under the framing of a railway carriage, there being on the ends of these bars hinged levers, one end of each of which carries a brake block. Behind the levers is a flat bar which is fixed, and at the distance of about a foot another flat bar, which is moveable. Between these bars is a drawer or box, composed of two heads or solid framings, each being screwed to one of the flat bars, and the two being connected “by any air-tight flexible material. The moveable head is furnished at its inner centre with a rod or tube, which passes through the fixed head, and acts (as piston) on the ends of the levers not holding the brake blocks” already mentioned. “Springs are placed on the moveable head to cause the drum or box to expand after use.” On the tender of the train is a cylinder or tube, communicating with a pneumatic engine or pump, and also a metallic box divided into two compartments, one of which is about double the size of the other. Pipes furnished with stop-cocks connect the box with the cylinder.

and other pipes furnished with stop-cocks connect the cylinder with the drums under the carriages, the pipes of one carriage being connected with those of another by tubes of suitable elastic material. The air is withdrawn as completely as possible from the compartments, the communication between them and the pneumatic engine is shut off, and the apparatus is then ready for action. When it is necessary to apply the brakes, as, for instance, on approaching a station, the stoker opens the cock of the pipe communicating with the drums, and the air contained therein rushes into the smaller compartment, thus creating a partial vacuum in the drums, and causing the pistons of such drums to act upon the levers and apply the brakes to the wheels of all the carriages composing the train, and in case of apprehended collision the communication with the larger compartment is opened, this not only increasing the pressure on the brakes of the carriages, but also applying brake blocks to the wheels of the engine. These arrangements may be variously modified, and indexes may be used to show the amount to which the air has been rarified in the compartments.

[Printed, 4d. No Drawings.]

A.D. 1863, February 27.—N° 557.

DUDGEON, ARTHUR, MEAKIN, GEORGE FREDERICK LEE, and ALLEN, EDWARD ELLIS.—“Improvements in the construction of underground railways or subways, and in carriages to be used or worked therein.”

That part of this invention which relates to carriages, consists in forming such carriages so as to enable them to pass through subways of less height than those usually constructed, the reduction of the height of subways intended for railway purposes being one main object of the invention.

The carriages are so constructed that the floors are below the axles of the wheels, such axles “passing under or between any pair of seats in a suitably constructed passage made from side to side of the carriage.” The wheels of the carriages work in recesses in their sides, “such recesses being open in front, and made to contain the springs, and grease boxes, and break blocks.”

“To enter such carriages no platform would be required, or one raised a few inches only from the level of the rails, and a

"waste of vertical height of from two to three feet avoided. The back of the recess for the wheels would in this case take the place of the ordinary 'horn' plates," but the latter may, if preferred, be outside the wheels, and be attached to the main framing of the carriage.

[Printed, 1s. Drawing.]

A.D. 1863, March 4.—N° 614.

TIZARD, WILLIAM LITTELL.—(*Provisional protection only.*)—

"Improvements in manufacturing curved armour plates and other ironwork, and in machinery or apparatus employed therein."

In this invention, instead of bending the plate or other article after it has been rolled to the requisite thickness, as usual, a number of thin plates, either in a hot or cold state, are bent to their necessary curvatures and forms by an ordinary plate bending machine, "the outside plate having a greater radius than the inner," the intermediate plates being arranged accordingly. The two outside plates are provided with projections or fins, which are made to lap over the edges of the whole, and keep them together, "but if other clamps are used they are unnecessary." These thin plates, having been piled one upon another in due order, are then heated and welded together, "without materially altering their respective shapes during the process." The welding process may be effected either by the use of rolls, so mounted as to correspond with the curvilinear form of the mass, in some cases one large roll corresponding with the inner surface of the curved plate, while smaller rolls are applied to the outer surface, the diameter of the large roll being adjustable by means of segments. Hydraulic and other presses may also be used for welding the plates, and the inventor states that ribbons of iron might thus be wound round and welded on to each other, and thus form the "tyre of railway and other wheels."

[Printed, 4d. No Drawings.]

A.D. 1863, March 5.—N° 619.

DWYER, ROBERT DOYNE.—(*Provisional protection only.*)—

"Certain improvements in springs to be employed in the manufacture of beds, seats, or for similar purposes where an elastic surface is required."



This invention is applicable, among other purposes, to the construction of springs for railway carriage seats, and it consists in forming "spring laths," upon which the seat may rest, by uniting two thin laths at or about the centre of their length by a band of tin or other material, "the extreme ends of such laths" being forced and retained apart by wedges inserted between "them near the central confining band," the portions thus separated forming "a spring at each side of the centre."

These spring laths "are to be employed instead of the ordinary "rigid laths at present used, and by being attached to a hinged "framing" they may be so connected to a bedstead (for example) that they may be raised at one part of such bedstead and lowered at the other, or so as to support a reclining bed for invalids. Such springs may also be applied to couches, chairs, and other articles.

[Printed, *ad.* Woodcut.]

A.D. 1863, March 24.—N<sup>o</sup> 769.

REILLY, JAMES, and MARTIN, WILLIAM.—"Improvements  
"in lubricating horizontal shafting and bearings of all descrip-  
"tions."

This invention consists "in forming the steps or pedestals of  
"horizontal shafting with a recess or box to contain the oil or  
"lubricating matter, so that as the shafting revolves it will only  
"take up or use as much of the lubricating matter as is necessary  
"for the purpose, and thus prevent the waste so generally com-  
"plained of." The patentees state that by the term "bearings"  
they mean the bearing surfaces of the axles of railway wheels,  
and axle boxes, as well as the bearing surfaces of the shafts and  
pedestals of marine and stationary engines and other machinery.

As applied to an axle box for a railway carriage the invention consists in forming the bottom of the box into a cistern for the lubricating matter, there being in this cistern a float, and also, when desired, a sponge or other absorbent material. The end of the axle revolves upon the float, in which apertures are made for allowing the lubricating matter to pass to the under side of the shaft and be spread evenly over the surface, by which means the oil or other matter is being continually carried up to the upper bearing and returned to the cistern, "and thus the shaft and  
"bearing are effectually lubricated." The end of the axle is enclosed in the box, and at the inside of the box next to the wheel

the axle is turned down, so as to form a flange and secure the steadiness of the wheel, the block or cap which contains the upper bearing being inclined, "to cause the oil or lubricating matter to run down upon the working part of the shaft."

[Printed, 8d. Drawing.]

A.D. 1863, March 26.—N<sup>o</sup> 799.

APPLEGATE, FRANK.—(*Provisional protection only.*)—"Improvements in railway carriage doors."

According to this invention the inventor proposes to employ sliding doors instead of doors on hinges. "The whole of the doors on both sides of the carriages (of course separate), or on one side, slide into recesses outside or inside as preferred." The inventor proposes to attach all these doors to a rod "provided at the end of each carriage with a suitable expanding hinge or other mechanical equivalent for connecting quickly, so that the guard at the end (or other compartment in which he is placed) can open all the doors at once when the train stops, and when the train has started close them simultaneously."

[Printed, 4d. No Drawings.]

A.D. 1863, March 30.—N<sup>o</sup> 818.

MUSHET, ROBERT.—"An improvement or improvements in moulds to be used for casting steel or homogeneous iron."

The essence of this invention consists "in making moulds to be used for casting steel or homogeneous iron, either wholly or mainly of sheet iron."

The invention is applicable in casting wheel tyres, as well as cylinders and other articles. The core or inner part of the mould is formed of a hollow cylinder of sheet iron, a second similar cylinder, but of larger dimensions, forming the outer part of the mould, and the metal which is to form the tyre or other article is run in between these cylinders. The cylinders are wider than the tyre or article to be cast, and are in some cases set up in a stratum or bed of sand or loam, while in other cases they are placed upon a plate of cast iron or steel, grooves being formed in the latter to receive them, the inner cylinder being filled with loose sand or with a loam core, such core being divided by planes intersecting each other, and the several portions of the core being loosely fitted together, "so as to yield and allow for the shrinkage of the

"steel or homogeneous iron" after casting. The two cylinders are placed in a foundry box, sand being rammed around the exterior cylinder so as to support it when the melted metal is poured between it and the inner cylinder, the whole being covered either with loam or by a cast-iron plate, suitable gates or openings being left for the admission of the melted metal, and air holes formed for the escape of air. Before using this mould all the "scale" is removed from those surfaces of the cylinders which have to come into contact with the melted metal. In casting articles of large size the sheet iron mould sometimes becomes incorporated with the steel or other metal used, but sometimes the mould is only attached thereto, in which case the adhering sheet iron may be readily chipped or turned from the surface of the casting.

[Printed, 4d. No Drawings.]

A.D. 1863, April 1.—N<sup>o</sup> 837.

BRAY, JOSEPH. — "Improvements in the construction of omnibuses, railway carriages, and other vehicles."

According to this invention the patentee constructs "omnibuses, railway carriages, and other vehicles in the form of two stories," a suitable staircase being provided, "either inside or outside of the carriage, to ascend to the upper story."

Different modifications of the invention are described, in some cases the lower chamber or story of the omnibus or other vehicle being divided from the back to near the front, by a partition, into two compartments, "which open into each other at the front end." The seats are placed against the partition, and the passengers may pass through or return by either compartment.

At the back of the vehicle there are steps, either in the inside or on the outside, leading to the upper chamber or storey, the latter "having a passage in the middle, and seats at the sides and end."

In another arrangement these details are reversed, the lower storey or chamber having seats at the sides, and the upper storey or chamber having a partition in the middle with seats against it, similar to the lower storey.

These arrangements are applicable "to all descriptions of omnibuses, railway carriages, and other vehicles," the seats being arranged "as described, according to the shape and di-

“mensions of the vehicle, which may be either covered, enclosed,  
“or open.”

[Printed, 10d. Drawing.]

A.D. 1863, April 1.—N° 838.

HENRY, MICHAEL.—(*A communication from Edwin P. Quadling.*)

—“An improved method of lubricating.”

This invention relates to a method of lubricating “especially  
“applicable to journals of railway plant.”

“In this method oil or other lubricating material capable of  
“being conveyed by capillary action is used instead of ordinary  
“grease,” such oil or lubricating material being “raised to the  
“journal or surface to be lubricated from the bottom cistern of  
“the axle box, or from other reservoir or part containing such oil  
“or material by means of the capillary action of cotton or other  
“wicks, or other capillary conductors or agents suspended on or  
“carried over a cradle or frame fitted in the axle box, or in an  
“equivalent situation; flat cotton wicks are preferred as the con-  
“ducting agents, and oil as the lubricating material.”

The patentee recommends that in carrying the invention into  
effect “the cradle or frame be constructed of four or more end  
“pieces united by longitudinal pieces parallel with the journals  
“on each side, on which parallel pieces the wicks are so suspended  
“or placed that a portion thereof shall be in the oil, while another  
“portion shall pass under and touch the lower side of the journal,  
“thereby maintaining a constant supply of oil thereto.”

“The cradle prevents the wick from pressing heavily against  
“the journal, so that very little friction results, and the wick is  
“protected from liability of being burnt by the overheating of  
“the journal.”

[Printed, 10d. Drawing.]

A.D. 1863, April 8.—N° 885.

BROWN, JOHN NURTHALL.—“Improvements in securing or  
“connecting the bearing springs of railway carriages and wagons  
“to the axle boxes of the said carriages and wagons.”

The object of this invention is to connect the bearing springs  
of railway carriages and wagons to the axle boxes “more  
“effectually than can be done by the use of the ordinary tie  
“bolts and clips.”

In one modification of the invention the patentee substitutes for the ordinary spring rivet an eye bolt, the head of which passes through the top of the grease chamber in the axle box. "A bolt " or pin is passed through the sides of the axle box underneath " the top of the grease chamber, and through the eye of the eye " bolt. This being done, the nut of the eye bolt at the top of " the spring is screwed up, and the spring is then firmly secured " to the axle box."

Another improvement consists "in extending the lugs which " form part of the spring hoop a sufficient distance down the " sides of the axle box to enable a bolt to be passed through the " said lugs and underneath the top of the grease chamber as " before. Or instead of using a bolt the same object may be " accomplished by using a screw pin on each side of the axle box, " the said screw pins being tapped into the axle box."

Different modifications of the invention are described.

[Printed, 8d. Drawing.]

A.D. 1863, April 11.—N<sup>o</sup> 918.

**SAMUEL, WALTER.** — (*Provisional protection only.*) — "Im-  
" provements in or applicable to railway carriages, to mitigate or  
" lessen the effects of collisions to passengers."

This invention consists, in the first place, "in constructing car-  
" riages with a larger number of transverse partitions therein  
" than there are in those at present in use," and placing across  
the carriages one row of seats only, "so that passengers shall not  
" sit opposite to each other, and there shall not be danger from  
" one person being thrown against another at the instant of  
" collision."

Another part of the invention consists in placing around rail-  
way carriages, of whatever construction, air cushions made of  
india-rubber or other flexible material, assisted by springs, or by  
padding or stuffing. These cushions are about the height of a  
man's shoulder when seated in such a carriage, and they may be  
secured in their places in various ways. The inventor recom-  
mends that in using carriages constructed according to the first  
part of the invention, "the passengers should travel with their  
" faces towards the engine, and that the air cushions should  
" almost cover the surface of the partition, or be the partitions  
" themselves, so that when collision takes place the passengers

“ shall fall against the cushions, and in many cases suffer little or  
 “ no injury compared with the concussions consequent on railway  
 “ collisions in carriages of the present construction.”

[Printed, 4d. No Drawings.]

A.D. 1863, April 18.—N° 975.

BURDEN, WILLIAM BENONI.—(*Provisional protection only.*)—

“ Improvements in wheels and axles, applicable to locomotives,  
 “ carriages, and paddle wheels.”

In this invention the arms of the axles of railway carriage wheels, as well as those of carriages for common roads, are formed in such manner “ that they shall be horizontally at right angles  
 “ to the centre line of the carriage fore and aft, or to the line of  
 “ progress, the same being vertically declined to the extent, by  
 “ preference, of seventeen degrees and three-fifths, or thereabouts,  
 “ or not less than nine, nor more than twenty-five degrees. The  
 “ wheels are to be so constructed that as they revolve on level  
 “ ground, each spoke, or the medium line of the spokes, shall be  
 “ vertical, notwithstanding the vertical declination of the axle,  
 “ so as to have an upright bearing under the axle, the tires, if  
 “ flat, being horizontal on the ground, but they may be convex  
 “ or of other sectional form.”

“ For locomotives, or for railway carriages, where the wheels  
 “ revolve fixed or keyed on their axles, so that their axles revolve  
 “ with them, the faces of the wheels are to be horizontal on the  
 “ rail, the centre line of each axle being vertically declined, as  
 “ before described, the bearing of the spokes between the tires  
 “ and the axles being upright, whether the faces of the wheels  
 “ are horizontal or otherwise on level rails.”

[Printed, 4d. No Drawings.]

A.D. 1863, April 20.—N° 978.

ROWELL, PHILIP GEORGE, and HOLT, HENRY.—“ A better

“ and more economical mode of securing the bands of locomotive  
 “ engine and tender springs, also a new method of applying the  
 “ same.”

According to this invention the band is “ to be made open at  
 “ the top to admit the spring, and the spring to have indian-  
 “ rubber, leather, or other suitable substance placed between the  
 “ leaves thereof, and said leaves to be secured by means of a gibb.



"cottar, and slotted collar plate, to be applied as follows :—After  
"the leaves composing the springs have been placed in the band  
"aforesaid, with the indian-rubber, leather, or other suitable substance between them, the slotted cottar plate to be placed on the  
"top leaf of said spring, and secured by means of the gib and  
"cottar being thrust through the slot made at top of band,  
"and fastened and drawn tight by means of a screw nut on the  
"outside of the band. The leaves of the spring aforesaid to have  
"a parallel notch cut in their edges at the spot where they enter  
"said band."

By these arrangements the band is applied without being heated, and may be readily removed and replaced.

[Printed, 8d. Drawing.]

A.D. 1863, April 23.—N<sup>o</sup> 1007.

PROFFITT, JOHN WILLIAM, and DUNCAN, WILLIAM LUNDI.—"An improved mode and apparatus for distributing  
"sand or any other suitable substance or substances on the rails  
"of railways and tramways."

One mode of carrying out this invention is described in which the generator or boiler of a locomotive is provided on its upper part with a receptacle having at each end of its bottom part six openings, to which a similar number of pipes are attached, the arrangement being such that one pipe descends in front of and one behind each wheel of the locomotive. The receptacle is filled with sea-side or other suitable sand through doors arranged in the upper part thereof, and by means of certain valves, which may be opened and closed at pleasure, a discharge of sand upon the rails may at any time be effected. The valves move horizontally on pivots which are provided with levers, the latter being connected with one or other of two horizontal rods capable of sliding longitudinally backwards and forwards, and furnished with handles by which the engine driver may operate upon them and so open the valves more or less, as may be requisite. The horizontal rods are furnished with teeth upon a part of their length, such teeth being in gear with those of pinions capable of moving freely upon pivots. The object of placing the receptacle for sand upon the generator or boiler is to keep the sand dry, and in order that the action of the atmosphere may have "a less condensing effect" upon the

generator a partition may be inserted in the receptacle, thereby dividing the same into two compartments, that next the generator being filled with charcoal or other non-conducting substance, and the outer one containing the sand; openings being made in the latter to permit the escape of any moisture that may be contained in the sand.

Instead of the valves mentioned above cocks, slides, or other suitable appliances may be used, and the receptacle for sand may be applied to the tender or to one of the carriages of a train; or more than one receptacle may be applied to such train. Instead of sand a mixture of sand and salt may be used, or any other suitable substance may be employed. In applying the receptacle to a carriage it may, if desired, be placed under the body of such carriage.

[Printed, 8d. Drawing.]

A.D. 1863, May 2.—N° 1102.

GIBSON, JOHN WILLIAM, and TURNER, WILLIAM.—(*Provisional protection only.*)—"Improvements in springs to be used for railway buffers, draw-hooks, and also for carrying springs of railway carriages and other vehicles."

These improvements relate to the employment for the above-mentioned purposes of "volute springs or bars of steel, or their equivalents," in connection with certain arrangements for twisting or winding up such bars of steel. When applied to a railway buffer the volute spring "is secured at one end to a central pin (secured to the carriage frame or adjuncts thereof) and at the other to the inner circumference of a pulley drum, the outer circumference of which has a rope, chain, or cord connected thereto, and passed over the same, and over a sheave (connected to the inner end of the buffer rod), the other end of the rope, chain, or cord being connected to the guide or to the carriage frame. The buffer rod being driven in causes the volute spring to be acted upon by the action of the rope, chain, or cord that passes over the said sheave, as aforesaid, which is acted on by the motion of the buffer rod, giving a resistance against the buffer equal to twice that of the spring: it may, however, be used direct, if preferable."

[Printed, 4d. No Drawings.]

A.D. 1863, May 4.—N° 1113.

HASELTINE, GEORGE.—(*A communication from Richard Voss.*)  
—"Improvements in springs for railway carriages and other  
"purposes."

These improvements "relate chiefly to the use of longitudinally  
"fluted bars in the construction of spiral or helical springs;" also  
to certain novel modes of combining india-rubber or similar  
material with metal in the formation of springs for supporting  
heavy weights or resisting great pressure; and likewise to a novel  
construction of parts "whereby the strength is greatly increased  
"and the weight diminished;" as also to "so arranging the  
"parts as to augment the elasticity of the spring by means of  
"confined air."

"The required elasticity of the compound spring is obtained by  
"the use of a spiral spring in connection with india-rubber or  
"similar material, or by the use of one or more concavo-convex  
"springs and india-rubber, or by the employment of india-rubber  
"in connection with confined air."

Various modifications of the invention are described.

[Printed, 8d. Drawing.]

A.D. 1863, May 5.—N° 1121.

APPLEGATE, FRANK.—(*Provisional protection only.*)—"Im-  
"provements in stopping and starting railway trains."

This invention consists "in the application of a spring or  
"springs, to be thrown into gear to take up the vis viva of a  
"railway train," such spring or springs being applied "in con-  
"nection with the wheels of the tender while in motion," a  
breaking action being at the same time applied to the latter,  
"whereby to stop the train." The invention is carried into  
effect "by means of clutches and spur gear, which are in con-  
"nection with the wheel axles of the tender and some fixed parts  
"thereof, which by means of suitable levers enables the stoker to  
"apply the resistance of the springs to oppose rotation of the  
"wheels, and again to transfer and dispose it in such manner  
"that the tension of the springs so accumulated and stored (so  
"to speak) shall be given out and developed in again starting  
"the train."

[Printed, 4d. No Drawings.]

A.D. 1863, May 8.—N° 1158.

**BIELEFELD, CHARLES FREDERICK.**—"Improvements in the manufacture of sheets, slabs, and other articles when fibrous materials are employed."

This invention is set forth as being applicable, among other purposes, to the construction of railway and other carriages, and a composition is mentioned as being suitable for the purposes of the invention, which consists of one pound of clay, one pound of lime, one pound of pumicestone, six pounds of paper pulp, and eight pounds of soluble silica, or "water glass." These ingredients, having been well mixed, are placed in suitable frames or moulds, and the plates or slabs thus formed are used either singly or in combination, and may be employed not only in the construction of railway and other carriages, but also in the formation of billiard and bagatelle beds, panelling generally, the linings of ships, building, and other purposes.

[Printed, 4d. No Drawings.]

A.D. 1863, May 11.—N° 1183.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from Bartolomé Castellvi.*)—"Improvements in coupling and disconnecting carriages on railways, and in machinery employed therein."

By this invention "the coupling is engaged by the simple coming together of the carriages, without the aid of any attendant," and the disconnecting "is effected from the outside of the line of rails, without the attendant having to pass inside the buffers."

Each end of each carriage is provided with a rod, at the outer end of which is a hook, and at the other end a small hook by which it is connected to the draw spring. The hooks of the several carriages are united by means of links, the arrangement being such that the apparatus of one carriage becomes united with that of another on the two being pressed together, the links being slightly inclined, and certain curved and other rods, some of which are furnished with caoutchouc rings placed in tubes, keeping the parts in their places while allowing them to play freely. Certain bars are employed to prevent the hooks from leaving the links, and by turning certain of the rods already

According to this invention "worn  
"tured into new tyres in hoops  
"manner." Thus an old tyre from  
for example, is heated, and then passed  
rolling machine, provided with comp  
outside of the red hot hoop, where  
reduced, and the thickness increased  
the rolls at the same time giving  
tyre thus produced. The patentees  
first place, to reduce the diameter  
required for the finished tyre, and  
inside as well as the outside of the  
press the iron, the result of the work  
serviceable tyre is produced from the  
size than the original tyre.

According to another mode of treatment  
heated and then placed in a mould  
poured around its outer face to make  
the whole being afterwards rolled "in  
"tion." The outer surface of the  
order to give the molten metal a better  
patentees mention that they prefer  
the machine known as Bodmer's  
pressing rolls added thereto.

[Printed, &c. No Drawings.]

" passage either nearly all round the outside, or in the interior of " the vehicle," there being in the centre of the vehicle a spiral staircase, by which passengers may ascend to the roof, which is provided with seats and a covering, and " may be furnished with " Venetian shutters to protect the passengers from the heat or " cold, as the case may be," this covering being rounded so as to adapt the carriage for passing under tunnels. At each end of the carriage are steps and a platform, giving access to the doors, and the body of the carriage is divided into three compartments communicating with each other by means of sliding doors. On each side of the carriage is a small folding table, and on the platform at one end of the carriage is a watercloset, access to which is attained by means of a door and steps, the latter being lowered and raised by the opening and shutting of the door. Passengers may leave one carriage and enter another, if desirable, by means of iron flaps which are hinged to the ends of the carriages, and can be raised and lowered at pleasure.

[Printed, 10d. Drawing.]

A.D. 1863, May 26.—N° 1326.

KITSON, FREDERICK WILLIAM, and KITSON, JAMES, the younger.—"Improvements in the manufacture of the tyres for " railway wheels, and in the means of securing the tyres to the " wheels."

This invention "relates to an improved mode of forming the " tyres of railway wheels without a joint or end weld." Pieces of iron are first packed and welded together into the form of a ball, two, three, or more of these balls being then united so as to form a slab, three of the latter being then welded into a solid block. An elongated hole is then punched or otherwise formed in this block, and it is then placed in a heated state in a press, and acted upon by a conical plunger, which is made to enter the hole or opening, and gradually work the block into the form of a ring. This ring is then subjected to a swaging operation to consolidate the metal, and finally beaten upon a suitable anvil into the form of a flanged tyre. In order to fix such a tyre securely upon the rim of a wheel, one of its inner edges is provided with an "overlapping lip," while near the other inner edge is an undercut or dovetail groove, into which is inserted a wrought-iron ring having a projecting flange, which is turned down outside the



rim; or instead of a ring, separate pieces having projecting tails or flanges may be used. This arrangement may be varied by forming a dovetail groove in the rim of the wheel, a holding ring taking both into that and into a notch or groove in the tyre.

[Printed, 10d. Drawing.]

A.D. 1863, May 29.—N<sup>o</sup> 1349.

ABADIE, ALFRED.—“Improvements in railway breaks.”

This invention has for its object the application to railway carriages of arrangements “by means of which the rolling motion “ of the several wheels on the rails may be converted into a “ sliding motion thereon with increased facility and effect.” For this purpose there are applied to each pair of the wheels of such carriages a set of breaks, which are capable of being brought into action on either side of the wheels, and consisting of a pair of skids or shoes corresponding in section with that of the wheel tyres, such skids or shoes being suspended by curved arms from a cross rocking shaft mounted in a bracket fixed to the frame of the carriage. To these arms chains are connected, and passed over barrels, by the revolution of which the skids or shoes on one side of a pair of wheels are drawn up, while those on the other side are let down upon the rails in front of such wheels, which are then “caused to slide on the rails with the skids or “ shoes under them.” The several barrels of one carriage are mounted upon a longitudinal shaft, which may be put in motion by a worm and worm wheel turned by a handle in the ordinary manner, and the shaft of one carriage is connected to that of another by means of a socket and universal joint. Thus the breaks of a number of carriages may be brought into action simultaneously, a notched disc being keyed upon the shaft of each carriage, and such notch receiving a catch fixed to the framing of the preceding carriage, by which means the shafts are prevented from turning when not required to do so.

[Printed, 10d. Drawing.]

A.D. 1863, June 1.—N<sup>o</sup> 1363.

HENSON, JAMES.—(*Provisional protection only.*)—“Improvements in the construction of railway carriages.”

According to this invention the skeleton frame of the carriage is composed of light trellis or lattice work iron, the inside being

lined with wood, kamptulicon, or other suitable material, and the outside with leather, gutta percha, or other yielding material. Each end of the carriage is of round form, and divided into two or more compartments, with a passage in the centre transversely or longitudinally, the compartments being divided by sliding doors to allow communication from one compartment to another. The seats are furnished with spiral springs, placed upon india-rubber instead of webbing, as heretofore, and are covered with any suitable material, the backs of the seats being curved. For sun blinds green glass slides are used, and the interior of each compartment is furnished with a table, the top of which may be plate glass and so serve as a mirror, and footstools, umbrella stands, hat pegs, ventilators, and other conveniences "to shew as "mouldings."

[Printed, 4d. No Drawings.]

A.D. 1863, June 13.—N<sup>o</sup> 1478.

DAVIES, GEORGE.—(*A communication from Henry Wood.*)—"An improved mode of oiling journals or axles."

This invention relates more particularly to the axle boxes of railroad cars in which a receptacle for oil below the journal is furnished also with cotton waste, the oil being supplied to the journal by capillary attraction, and the invention consists in substituting for such waste shavings of wood, the patentee stating that it has been discovered that cotton waste is liable to become charred, and is also attended by other objections, from all of which shavings of wood are free.

Shavings from deals, pines, and spruces are mentioned as being especially applicable for the purposes of the invention.

[Printed, 4d. No Drawings.]

A.D. 1863, June 16.—N<sup>o</sup> 1509.

FRASER, ALEXANDER JOHN. — "Improvements in apparatus applied to house and carriage window sashes for the working and fastening thereof."

This invention consists, in the first place, in the use of a ratchet-toothed rack, which may be applied to the inside of a window frame, this rack extending from top to bottom of the sash, and the horizontal part of each tooth being upwards. On

the window sash is a spring bolt, which is placed so as "to abut  
" its end against the rack, and by the pressure of its spring is  
" kept up thereto, and is at the same time free to recede." The  
effect is that on raising the sash "the bolt slips over the inclined  
" faces of the teeth freely, catching at each one and preventing  
" the sash again descending from any intermediate distance to  
" which it may be raised, or at full height. Thus, in opening a  
" window, it is simply necessary to lift the window to the  
" required height. If it is desired to lower it is simply necessary  
" to withdraw the bolt from contact with the rack teeth and  
" lower it down. When closed a hole is provided in the rack at  
" that point to receive the end of the spring bolt, which shoots  
" into such hole and prevents the window from being again raised  
" until the bolt is withdrawn, which of course can only be done  
" from the inside." If it be desired that the window shall be  
capable of being opened and remain open for a few inches only  
without the possibility of its being further opened from the out-  
side, another bolt is placed at the top of the sash, and so arranged  
as to be moved at pleasure into one of several holes formed to  
receive it; or a cross latch may be applied to the spring bolt.

By these arrangements the counterbalance weights and boxes  
usually applied to windows may be dispensed with, although the  
patentee recommends that very heavy sashes should be partially  
counterbalanced. Instead of the ratchet teeth being upon the  
framing and the bolt upon the sash their positions may be  
reversed, and the bolt in that case operated by a handle or  
key.

Another part of the invention consists in the employment of a  
rack having teeth similar to ordinary spur gear, or by preference  
"teeth with semicircular tops and bottoms," a wheel or rotary  
catch being in gear with this rack, and such wheel being mounted  
on a spindle in the window frame, a pendant arm or pawl taking  
into the teeth of this wheel, and forming a kind of escapement  
thereto, permitting the rotation of the wheel in one direction, in  
which direction it is turned by the rack when the window sash is  
raised, but preventing the retrograde movement of the wheel and  
consequently the descent of the sash until removed from contact  
with the wheel, which is effected by the use of a "thumb knob"  
provided for the purpose, a second catch being so arranged that  
if necessary it may be made to act upon the wheel and prevent

the window from being opened. In order to secure the window in any given position when opened a certain catch is provided, which may act upon the pendant arm or pawl, and keep it in the teeth of the wheel as long as desired.

In addition to these arrangements the weight of a heavy sash may be partly counterbalanced by the use of a spring which is coiled round the axis of the wheel, "which spring in coiling itself" up, assists in sustaining the weight of the sash."

The invention is described under various modifications, some of which are applicable to the windows of railway and other carriages, india-rubber being used in these cases to render the window "weather-tight" and prevent rattling of the sash.

[Printed, 1s. Drawing.]

A.D. 1863, June 25.—N° 1603.

KIRRRAGE, WILLIAM.—"Using apo elastikon hyphasma as a " new and improved cloth for floors, roofs, walls, tanks, and other " linings, being impervious to damp, and of great strength and " durability."

This invention consists in amalgamating certain substances together and so producing a compound which may be used, among other purposes, in the construction of railway carriages, and also cabs.

India-rubber or gutta percha, or a mixture of the two, is first well masticated, and then mixed with the residue from cotton seed oil, and in some cases sterine pitch, along with as much vegetable fibre as will convert the mass into a strong felt. In this state it is removed from the masticators, and passed through mixing rollers, as much farinaceous matter being added as will bring it into a fit state for the finishing roller, by which it is operated upon in a heated state, and may then be used, either in a plain or ornamented state, for staircases, public halls, and passages. In order to harden the composition and render it more suitable for carriages, &c., common chalk or "talk" is added to the mixture while in the masticators, and steatite or French chalk before passing it through the finishing rollers.

The invention is applicable in the formation of gutters, the packing of joints, and various other objects.

[Printed, 1d. No Drawings.]

A.D. 1863, July 1.—N<sup>o</sup> 1641.

TAYLOR, THOMAS.—“Improvements in railway brakes.”

According to one part of this invention certain brake or friction wheels are mounted upon an axle placed in bearings midway between the ordinary axles of a railway carriage, and capable of being raised and lowered by means of a screwed shaft, and a hand wheel which may be turned by a person inside the carriage. The brake wheels are formed with double flanges, the inner sides of which are bevilled in such manner that when the wheels are lowered they “bite both sides of the rail, and thus cause a sufficient amount of friction to retard the motion of the carriage.” A spring may be placed in the bearings, to assist in raising the wheels, this arrangement also enabling them to rise when passing over points, and, if preferred, instead of entire wheels segments only may be used.

In another part of the invention a grooved wheel is fixed upon each axle of the carriage, into the groove of which a wedge-shaped brake is made to enter, either by means of the ordinary buffers or supplementary buffers, or by means of levers which may be moved by hand. In other cases collars are fixed on the axle and operated upon when necessary by moveable friction wheels which are pressed against the collars by means of screws. The invention also includes the use of friction wheels for biting the rails which are made in two portions, and so contrived that the flanges may be made to bite the rails with greater or less force. Also the use of friction wheels with roughened surfaces, which may be pressed when necessary against the inner parts of the running wheels of the carriages, all these arrangements being capable of different modifications.

The patentee also describes, as a “most important feature” of the invention, a mode of applying simultaneously the brakes of all the carriages of a train, whether such brakes be constructed according to the present invention or otherwise, by means of longitudinal rods, one of which is mounted below each carriage, the rod of one carriage being connected to that of another by sockets or universal joints, and the whole being moved simultaneously by means of suitable gearing, worms on such rods then turning worm wheels, which, through the medium of levers, apply the brakes.

[Printed, 8d. Drawing.]

A.D. 1863, July 6.—N° 1674.

ADAMS, WILLIAM BRIDGES.—(*Provisional protection only.*)—  
“Improvements in wheels and their tires, axles, and axle  
“ boxes.”

As regards wheels, this invention consists partly in so arranging the tires that they may move round the wheels when in motion “to compensate on curved lines of rail or road for equal diameters, by varying revolutions of the tires.” The wheels and tires may be in close contact, and be lubricated if desirable, or polished washers or hoops of steel may be placed between them, the tires being kept in their places on the wheels by a lip or dovetail in front and a plain or lipped rib behind, locking into grooves in the wheel or tire, or both, or by segments of hoops driven into conoidal grooves in the wheel and tire, various modifications of these arrangements being mentioned. Another improvement in wheels consists in the application of improved springs between the wheels and tires, such springs being thickest “in the centre of the breadth,” the side next the wheel being conical or curvilinear, or with a flat in the centre, “so that both wheel and tire may be cylindrical and not conical.” Or the springs may be curved, with their edges abutting against side ribs on the tire or wheel, or they may be corrugated; and they may be rolled in a solid ring without a joint, and may be so arranged as to serve as fastenings to unite the tires to the wheels; or bolts may be used as fastenings.

As regards axles and boxes the invention consists in “making the axles hollow and without collars to the bearings, the hollows containing air or water or lubricating material, and the ends of the axles abutting on the boxes, or the boxes abutting on the wheel naves.” And when the boxes “are made to work on curved lines through the horn plates for curved lines of rail, they may be connected with the traction apparatus and buffer apparatus to suit the connection with the trains, so that the wheels and buffing and traction apparatus may radiate together.”

[Printed, 4d. No Drawings.]

A.D. 1863, July 14.—N° 1753.

BOURNIQUE, LOUIS MARCEL, and VIDARD, JEAN BAPTISTE.—“Certain improvements in railway carriages.”



" between the compressing rolls. These rollers are or may be  
" moved to and fro lengthwise of their axes, by screws or other  
" equivalents, for squaring and rounding the corners of the hoop  
" or tyre, or they may also be set at an angle to the edge on  
" which they act."

Thirdly, in moving one of the main compressing rolls endwise by means of a screw or other equivalent during the rolling of the hoop or tyre.

Fourthly, in applying a roller to the upper and under edges of the hoop or tyre after or before it has passed between the compressing rolls, "for contracting and consolidating the hoop or tyre and finishing the edges."

Lastly, "in constructing thermometers in the shape of a wheel for ascertaining the temperature of hoops or tyres that have been or are to be rolled." Such a thermometer may be constructed by employing a wheel with a hollow rim containing mercury or other fluid, such wheel being in communication with a graduated glass tube connected to the axle on which the wheel revolves.

[Printed, 10d. Drawing.]

A.D. 1863, July 24.—N<sup>o</sup> 1851.

BARNES, WILLIAM LAWSON.—(*Provisional protection only.*)—

" An improved method of breaking the speed of and stopping  
" railway trains or other locomotive wheeled carriage or carriages,  
" at the same time signalling to the driver; or for using the  
" signal and break separately."

" On each side of the carriage or break there is a rod attached  
" at one end to a pin on an eccentric in the wheel, the other end  
" being attached to a piston working air-tight in a cylinder.  
" When the carriage is put in motion the wheel moves the piston  
" in the cylinder, the length of cylinder and stroke of piston being  
" twice the eccentricity of the wheel. The cylinder is placed in a  
" horizontal position, or at a small angle to the horizon, and  
" attached to the framework of the carriage, but always in such a  
" position that the eccentric pin of the wheel, the rod, and piston  
" shall move in or nearly in the same plane as the axis of the  
" cylinder. The end of the piston attached to the rod must be  
" kept in position with the centre or axis of the cylinder by slides  
" or slide rods, similar to the steam piston working in the cylinder

“ of a steam engine. The cylinder being open at each end the  
“ piston will move freely from end to end in the cylinder without  
“ impeding the speed of the carriage. But when it is necessary  
“ to apply the break, close the end of the cylinder which is furthest  
“ from the wheel by a valve, and the air in the cylinder being  
“ condensed will prevent the piston moving up the whole length  
“ and so reacting on the rod and eccentric will prevent the wheel  
“ from revolving, and make it skid or slide; should the piston be  
“ near the further end of the cylinder when the valve is closed,  
“ and there be not sufficient condensed air in the cylinder to  
“ prevent the wheel turning round, the returning piston will  
“ cause a drag upon the wheel by the process of exhaustion in  
“ the cylinder, and having returned to the primitive position or  
“ entrance of the cylinder” the latter will be filled with air  
through an aperture provided for that purpose immediately  
beyond the end of the withdrawn piston, and the condensed air  
will prevent the wheel from revolving. “ If at great speed it be  
“ not desirable suddenly to bring the wheel to a slide a receiver is  
“ provided at the further end of the cylinder, communicating  
“ with it by means of a valve opening up into the receiver,” the  
result of this arrangement being that the wheels of the carriage  
may either be brought to a slide suddenly or at any given  
number of revolutions. Such a receiver may be provided with  
whistles, and be made the medium of establishing a code of  
signals.

[Printed, 4d. No Drawings.]

A.D. 1863, July 30.—N<sup>o</sup> 1889.

SMITH, GEORGE, the younger.—“ Improvements in the buffing  
“ and traction apparatus of railway carriages and waggons.”

According to this invention the buffer rods of railway vehicles  
are converted into traction rods by combining with them air  
cylinders and pistons, and coupling the two buffer rods by a rigid  
cross bar to which the draw hook is attached, the buffers being  
consequently extended or drawn out when a tractive strain is  
applied, and forced inwards when under compression, and these  
movements being transmitted to air-tight pistons in cylinders, the  
air in each cylinder “at either end thereof” will be compressed,  
and will act as a cushion. It is only proposed, however, to con-  
fine a portion of the column of air within the cylinder, the

remainder being permitted to escape gradually through small vent holes, or to pass from one side of the piston to the other through a slot in the cylinder, so that recoil of the buffers will be prevented. The cylinders are provided with suitable means of lubrication, and a cast-iron coupling is employed for connecting the rigid cross bar with the buffer rods, the ends of the bar being slotted to allow of free play in the buffer and piston rods. And in order to prevent the couplings from jarring or jamming against the under framing, cushions or springs of vulcanized india-rubber or other suitable material are placed in front and in rear thereof.

Different modifications of the invention are described.

[Printed, 1s. 4d. Drawings.]

A.D. 1863, August 4.—N° 1919.

ABRAHAM, JOSEPH.—“Improvements in brakes for railway  
“and other carriages.”

This invention relates to giving motion to a brake or brakes by means of a shaft for rotating or turning the brake apparatus, and also to means of “communicating the forward or backward  
“motion for one brake to the next adjoining brake apparatus or  
“several thereof.”

To the under side of each carriage of a railway train (for example) are fixed bearers, blocks, or other supports for apparatus suitable for giving motion to the shaft, arms, or levers for operating the brake or brakes, and to or within one of such supports is connected or mounted a box nut “which is free to turn or rotate,  
“but is prevented from moving longitudinally.” Within another of such supports works a shaft having a coarse pitched screw at one end, and at the other a forked or hollow extension, and a disc or plate having through it a square or other suitably shaped hole through which a correspondingly shaped bar is passed, these arrangements serving to couple the shaft of one carriage with that of another, and being capable of variation according to particular circumstances; gearing, universal joints, and other apparatus being employed as may seem most desirable, or screws being in some cases used.

The whole invention is described at some length, the details thereof being capable of variation. The patentee claims in particular the employment of two rods or bars for working the brake blocks of one pair of wheels, “both rods being free to revolve,

" whilst one has also a longitudinal motion communicated to it by  
 " means of a rotary motion " combined with screws, the friction  
 brake block "being actuated by the longitudinal motion or  
 " traversing of one of the rods or bars." Also the employment  
 of a series of articulated bars taking into or screwing one into the  
 other, whilst the outer ends are so formed as to readily couple to  
 the next rod, or to the rod projecting from and belonging to the  
 next adjoining carriage, either by the means described, "or any  
 " other which may be found equally well or better suited to the  
 " purpose."

[Printed, 10d. Drawing.]

A.D. 1863, August 14.—N° 2010.

GREENWOOD, ROBERT BENJAMIN.—"Improved means of  
 " preventing accidents upon railways."

This invention is designed to prevent the engines and carriages  
 of railway trains from leaving the rails in consequence of obstruc-  
 tions on the latter, or some other accidental circumstance, and the  
 invention consists "in providing each engine, truck, or carriage  
 " with an additional pair of wheels in the centre, these wheels  
 " being made with the flanges reversed, that is to say, with the  
 " flanges running outside of the rails, so that should any obstruc-  
 " tion on the rails or other cause even raise all three of the wheels  
 " on one side off the rails, the other rail will be embraced by  
 " flanges on both sides, and will consequently keep the engine,  
 " truck, or carriage from running off the line."

The patentee mentions that in engines or carriages already pro-  
 vided with six wheels it will only be necessary to reverse the  
 wheels of the central axle, so that their flanges shall run outside  
 the rails. And such wheels may be mounted, either fast or loose,  
 upon one axle, or they may run, fast or loose, upon separate axles.

These arrangements necessarily require the points and crossings  
 of the rails to be adapted thereto, and the patentee describes  
 several modifications of those parts suitable for the purpose.

[Printed, 8d. Drawing.]

A.D. 1863, August 14.—N° 2015.

SIEGRIST, MICHEL. — (*Provisional protection only.*) — "Im-  
 " provements in railway breaks actuated by the pressure of the  
 " atmosphere."

This invention consists "of an improved mode of applying

“atmospheric pressure to the levers of the breaks of railway carriages, engines, and luggage vans, so that the breaks of the engine, vans, and all the carriages of a train can be put in action at once by a person at any part of the train, and in case of the engine or any van or carriage breaking away through any accident, the whole of the breaks of the train will act of themselves” and the progress of the whole train be arrested, the invention also admitting of the engine or any of the vans or carriages being coupled or uncoupled without the action of the breaks being at all interfered with.

The inventor mentions particularly a mode of carrying out these improvements in which a cylinder is placed underneath each carriage of a railway train, this cylinder being arranged in a vertical position, and having within it a piston, the lower end of which is connected to the ends of levers so combined with the breaks that when the pistons descend the breaks are forced against the wheels of the vehicle. Between each piston and the cover of the cylinder in which it is mounted is a spiral spring, so arranged that when the piston is not otherwise acted upon it is raised and the breaks set free from the wheels, the action of the breaks upon the wheels being caused by withdrawing the air from below the pistons, and so creating a degree of atmospheric pressure upon the latter, which forces them downwards. Suitable elastic pipes, formed of india-rubber lined with spiral springs, proceed to the cylinders from an air pump which is worked either by a donkey engine or by mechanism connected with one of the axles of the locomotive engine, or by other suitable means, other similar pipes serving to admit air to the cylinders when necessary, the pipes of one carriage being connected with those of another by means of sliding boxes furnished with valves and levers acted upon by springs: the arrangements being such that when one carriage is disconnected from another, the valves are kept in a closed state by the action of the springs and levers.

[Printed, 4d. No Drawings.]

A.D. 1863, August 17.—N° 2043.

CROSLAND, JAMES STEAD.—“Improvements in lubricating, and in arrangements and mechanism for lubricating the bearings, journals, or steps of spindles, shafts, axles, and other mechanism.”

This invention is set forth at considerable length, and relates in the first place to the application of water as a lubricant, such water being "used over and over again," and "contained in" boxes, circulating channels, and communicating pipes, or in "open dishes placed or formed beneath," and practically clear of the shaft, such water being raised for lubricating purposes by means of scoops revolving with the shaft, or certain centrifugal arrangements, and being drained off at the ends of the steps or bushes of the journal of the shaft into suitable receptacles, from whence it is again elevated.

Other parts of the invention relate to various arrangements of scooping pipes, scooping channels, and centrifugal apparatus, by means of which lubrication with either oil or water may be effected, these arrangements being set forth by the aid of drawings containing large numbers of figures.

The invention further includes a method of "forming cavities, chambers, or pockets on the ends of otherwise plain, removable, or portable brass or other bushes or steps of journals, or bearings of shafts and similar mechanism," combined with an exterior or interior communicating pipe or channel, and the use of water as a lubricating agent, and furnished with any suitable scoop, disc, or collar revolving with the shaft. Also a method of conveying oil or water from one end to the other of a journal or bearing by means of a pipe or channel carried outside of the supports of the bushes, journal box, or steps of such journal or bearing, the shaft being lubricated by a scoop, disc, collar, or other contrivance revolving with the shaft. Also certain arrangements of the footsteps of vertical shafts with collars, including "a moveable cylindrical collar shoe" for such shafts, "for purposes of improved lubrication." Also the construction of plummer blocks having passages or channels, spaces, discs, scoops, or pump chambers, or screens, in combination with water as the lubricating agent. Also a mode of forming a channel in the body of a shaft for conveying lubricating matter; and galvanizing or tinning receptacles containing water when the latter is used for purposes of lubrication.

All these particulars are set forth in detail, but the patentee does not confine himself to any special mode of arranging such detail.

The invention is mentioned as being applicable to "carriages."

[Printed, 2s. Drawings.]

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A.D. 1863, August 27.—N° 2117.

CLARK, JOHN.—"Certain improvements in break blocks for  
" railway and other carriages, and in the means of applying the  
" same."

This invention consists of improvements in the invention described in the Specification of the Patent granted to the present patentee on the 20th of October, 1862. "These new improvements consist, first, of compound levers and draw rods, which  
" give greater range to the blocks, and are so fitted and connected therewith as to cause the breaks to be released by the  
" gravitating power of the actuating mechanism when the break  
" power is taken off," springs for that purpose being dispensed with.

Different modifications of the invention are described. In one case pairs of long levers are mounted so as to nearly meet towards the centre of the carriage, where their free ends are connected so as to slide and be supported in a link, the other ends of the levers being centred towards the ends of the carriage frames, from which centres they radiate, their free ends, which are raised by a running chain, being connected with the blocks by draw rods, such blocks being placed beyond the wheels at each end of the carriage, and operating by being drawn against the wheels. In another case weighted levers are used, and in another case the ends of the draw rods are attached to levers so arranged that on the tightening of the running chain the rods and levers tend to form a right line, and so actuate the blocks. In other cases, the blocks are so hung between the wheels as to rise and fall; various other arrangements being described, friction wheels, drums, struts, cranks, levers, chains, and other mechanism, being described in profusion, and the break blocks being composed either of wood or of other material, but in the former case having "saw cuts therein  
" to lessen the vibration and improve their action." Disc wheels are also in some cases placed loose upon the carriage axles, and forced into contact, when necessary, with face plates or rings on the insides of the carriage wheels, the running chains being wound thereon. In other arrangements this "chain power" is made the means of depressing skids down into contact with the rails.

A "compensation spring break for common road carriages" is described, in which the driver or conductor of the vehicle de-

presses a treadle or handle, and so brings into gear certain toothed wheels, which then wind up a powerful helical spring which acts as a break to the motion of the carriage, this spring, when the wheels are thrown out of gear upon the stoppage of the carriage, assisting, by its effort to unwind, in again starting such carriage.

The invention further includes the employment of steam in suitable cylinders for aiding in applying the breaks of railway carriages, all the details of the invention being very fully set forth.

[Printed, 10d. Drawing.]

A.D. 1863, August 31.—N<sup>o</sup> 2145.

ATTOCK. GEORGE. — "Improvements in assistant bearing " springs for locomotive engines, railway carriages, waggons, and " trucks."

This invention relates to the application of india-rubber or steel springs between the under frames and bodies of carriages, trucks, and engines, in order " to isolate the wheels and under frame " from the body, and by this means to diminish the vibration " and shocks to which the body is subject from the inequalities " of the road."

In applying the invention to a carriage, waggon, or truck, there are attached to the under frame four or more iron brackets, each of which carries an india-rubber or steel spring, there being over each bracket wrought-iron guide bolts, which pass through the springs and brackets, and retain the body in its place. The guide bolts at the corners of the vehicle are longer than the others, " and are provided with screw ends and nuts and rebound " springs, so as to hold down or confine the action of the springs." All the bolts may, however, be thus provided if necessary, and the springs first mentioned, as well as the guide bolts, may be variously arranged, and as an additional safeguard, a wrought-iron bracket is placed inside the frame attached to the body frame, and provided with a slot, in which a bolt is secured to the head-stock of the under frame.

In applying the invention to an engine or tender, the under frame, in which the wheels and axles work, is made separate from that which supports the engine or tender body, the springs being

interposed between the two frames. The patentee states that he prefers to use springs made according to the invention for which a Patent was granted to George Spencer, on the 22nd of July, 1853, No. 1733.

[Printed, 10d. Drawing.]

A.D. 1863, August 31.—N<sup>o</sup> 2155.

ROBERTS, MARTYN JOHN.—(*Provisional protection only* —  
“Improvements in the arrangement or fitting of axles for railway  
“and other carriages.”

This invention consists in a method of permitting each wheel of a railway or other carriage, with its axle, to rotate independently of the other wheels and axles, the axles being at the same time supported in such a manner as to release them “as much as is  
“thereby possible” from the injurious influence of the oscillations of the carriage body.

“To obtain this desirable end, whilst using a separate axle for  
“every wheel, the wheel being fixed to one end thereof,” and that end being supported “in a manner well known,” the inventor supports the other end of the axle “by one or more  
“of the other axles of the carriage, either by a frame, collar, or  
“bearing, or by some other suitable contrivance.”

[Printed, 4d. No Drawings.]

A.D. 1863, September 3.—N<sup>o</sup> 2177.

BAILLY, NICOLAS.—(*Partly a communication from Charles Durand.*)—“Improvements in the application of rolling friction  
“to the axle boxes and journals of running shafts and axletrees  
“of machines and vehicles of all descriptions, for lessening the  
“resistance to the motion.”

The patentee, in setting forth this invention, mentions particularly “railways and their countless axletrees,” and states that his invention “allows the journals or axles to revolve without  
“being at all lubricated, the locomotion becomes much lighter,  
“and the wearing out is almost null, for the bearing parts are no  
“longer sliding, but rolling on each other.”

An arrangement is described in which the axle of a railway carriage (for example) sustains its load through the medium of a sphere or ball, there being at each side of but above the centre of the axle a hollowed or dished circular piece, provided with three

balls, against which a "covering piece" works, these covering pieces having bevelled or slanting edges, in contact with which the axle works, certain plates, pivots, and other mechanism being employed to keep the parts in their places.

Different modifications of the invention are described, suitable for application to horizontal and also vertical shafts, as well as axles.

[Printed, 8d. Drawing.]

A.D. 1863, September 5.—N<sup>o</sup> 2193.

SMITH, THOMAS.—(*Provisional protection only.*)—"An improved wagon break."

This invention "has particular reference to the breaks manufactured for export, and so generally used in wagons at the Cape of Good Hope and other places," but it may also be applied to "railway cars and carriages." In place of using a straight bar of iron as a handle for working the break, as usually practised, a wheel is employed, which has a handle attached thereto, the boss of this wheel being connected to the upper end of the rod which works the lever of the break, and the wheel being turned, when it is desired to apply the break, by means of the handle, "when pressure can be much more easily and quickly applied, and in a much more effectual manner than has hitherto been accomplished." The wheel may be of size proportionate to the power it is desired to exert, and it may, if desired, be furnished with more than one handle.

[Printed, 4d. No Drawinga.]

A.D. 1863, September 11.—N<sup>o</sup> 2242.

DOBBIE, JAMES.—"Improvements in the construction of railway and other carriages."

As applied to railway carriages this invention consists in constructing the framework of the upper part or body of the carriage "of hollow frames or ribs of iron or other metal," and of "trough-shaped section." "The frames are made of any required shape or form desired to be given to the carriage," each frame consisting of one piece, or of more pieces than one joined together by bolting, rivetting, or welding, "making one whole and complete frame or rib," and such frames or ribs being "placed transversely, or at right angles to the length of

" the carriage, and rivetted, bolted, or otherwise fastened to the longitudinal side beams of the under carriage or truck."

Various modes of carrying out the details of the invention are described, the patentee claiming particularly, in addition to constructing the framework of the upper part or body of railway and other carriages of hollow frames or ribs, as mentioned above; constructing the framework of the under carriage wholly of iron beams; arranging sheet iron or other sheet metal between the trough-shaped frames or ribs; and the employment of Z, T, U, or J iron beams for the framework of such under carriage. A wooden lining is in some cases placed within the iron framework.

[Printed, 1s. Drawings.]

A.D. 1863, September 17.—No 2285.

ULRICH, JOHN GOTTLIEB.—"Improvements in apparatus applied to railway carriages and trains, in order to obtain greater safety to passengers."

In this invention "the carriages of a train are coupled or connected to the locomotive engine by apparatus which can be more readily detached by the guard travelling in the first carriage of a train, and the apparatus is so arranged that should the locomotive engine leave the line of rails," the train will be disconnected therefrom, "and the parts of the coupling can be readily separated by the guard. For these purposes a lever arm is connected by a pin joint to the locomotive engine or to the tender, to which lever the train of carriages is to be connected in the following manner:—At the outer end of the lever arm is formed a hook with an incline, which, when a similar hook or instrument comes against it, the two hooks will pass each other by reason of the lever arm being acted on by a spring which yields as the two hooks are passing each other, but soon as they have passed each other, the hooked end of the lever arm is by its spring caused to assume its horizontal position, and thus retain the other hook from going back so long as the lever arm is retained by its spring in a horizontal position. The parts combined with these hooks are so arranged that the hooked end of the lever arm rests on a sliding or lifting pin which can at any time be acted on by a lever or other instrument put in motion by the guard or other person, so that

" the sliding or lifting piece is moved it causes the hooked end of  
" the lever arm to be raised beyond the other hook, so as to re-  
" lease the carriages of a train from the locomotive or the tender  
" to which they are coupled by the lever arm, and the lever arm  
" is also arranged to separate from the other hooked instruments  
" by which the carriages of a train are coupled to it in the event  
" of the locomotive or tender leaving the line."

Another part of the invention consists essentially in bringing the centres of the buffer heads of railway carriages " to or as near  
" as may be in the same plane as the axles of the wheels," the patentee stating that by this arrangement " the effect of a shock  
" on a train is materially modified, and the carriages and passen-  
" gers will be less liable to injury " than under the ordinary system of arranging these parts.

Another part of the invention relates to hanging the bodies of railway carriages " in such manner that the bodies may be capable  
" of moving forward a distance after the carriages and wheels have  
" been suddenly checked, so that the shock is not felt to such an  
" extent by the passengers as is now the case." With this object such bodies are suspended from the framing by means of links or suspending rods, springs being also connected to such bodies by which the latter are kept in position while travelling in the ordinary manner, but which springs will give way in case of a collision occurring to the framing of the carriage, and permit the bodies to move forward and also slightly upward; a rebound of the bodies being prevented by the application of certain stops and catches.

[Printed, 1s. 8d. Drawings.]

A.D. 1863, September 18.—N<sup>o</sup> 2297.

COOK, JOHN MASON.—" Improvements in railway carriages and  
" all other springed vehicles."

The objects of this invention are " to prevent noise, and to  
" diminish the oscillation of railway carriages and other springed  
" vehicles," and the invention consists in the introduction of vulcanized india-rubber or any other substance which will act as a non-conductor of sound between the wheels or springs and the body of the vehicle.

A mode of applying the invention to a railway carriage is described, in which a layer of vulcanized india-rubber, vulcanite, or any other substance which will act as a non-conductor of sound



is placed between the floor and the upper part of the framing of the carriage, layers of the same material being placed between the axle guards and the framing, as well as between the latter and the braces or straps by which it is connected to the inner ends of the springs. Such layers may be placed, in fact, between all the parts which serve to connect the springs, axles, and wheels to the framing or body of a vehicle; the holes in such layers, which are made for the purpose of receiving the pins or screws by which they are secured in their places, being made of somewhat less diameter than such pins or screws, in order that the latter may fit therein tightly, washers of the same material as the layers being also placed under the heads of the pins or screws, and in other places where requisite.

[Printed, 8d. Drawing.]

A.D. 1863, September 19.—N° 2317.

VICKERS, THOMAS EDWARD.—(*A communication from Jacob Mayer.*)—"An improvement in the manufacture of cast-steel tyres."

The object of this invention is "to effect a material economy in the manufacture of cast-steel tyres, by the introduction of a novel mode of moulding and casting such articles." The patentee states that hitherto such tyres have been moulded and cast singly, thus involving considerable manual labor in the preparation of the moulds when a large number of tyres have to be cast, and that according to the present invention a pattern is prepared which may be described as a cylinder composed of a series of patterns of tyres (by preference six), placed side by side or piled one upon the other, and secured firmly together. By the use of this pattern a "compound mould" is formed in loam, and a counterpart thereof obtained in cast steel, which is afterwards divided by sawing or other suitable means, and the different tyres thus obtained are turned and finished in the ordinary manner.

[Printed, 8d. Drawing.]

A.D. 1863, September 21.—N° 2320.

ELSDON, WILLIAM.—"An invention for the construction of rail and road carriages and improved wheel tyres, and an improvement in railway crossings adapting them to such carriages."

The object of this invention is to enable goods to be conveyed along a railway, a street, or a road, "in the same carriage without " being unloaded," as likewise to enable passengers to be conveyed along such railway, street, or road, without changing their seats.

The wheels of the carriages are furnished with tires, each of which is provided with two running surfaces of different diameters, the larger of these forming the running surface of the wheel when the latter is worked upon a street or ordinary road, while the smaller portion forms the bearing surface of the wheel when working upon a rail, the larger portion of the wheel then serving as a flange to keep the wheel upon the rail. These working surfaces may be so shaped on their exterior as to best suit the formation of the street or road and rails on which they are to work; and the tires may be formed of either iron or steel, or both, and rolled and otherwise treated by ordinary means.

Another part of the invention consists in so arranging the frames of the fore wheels of the carriages as to be moveable when the carriage is running upon a street or ordinary road, but capable of being locked when travelling upon rails. The frame of the fore wheels of each carriage is connected thereto by means of a central bolt or pivot, on which it is capable of turning when unlocked, but is locked when necessary by the insertion of other bolts, or by any other suitable means. Such frame may be composed either of wood or other suitable material, and the body of the carriage of iron or steel, or other substance. The carriage may be of any shape and size adapted to the purpose for which it is intended, and may be provided with shafts for use when being drawn along a street or road. And the wheels may either be loose upon the axles or fixed thereto, and the carriage be provided with springs or otherwise as thought best.

The rest of the invention relates solely to the construction of rails, with their crossings and other adjuncts, and does not require particular notice here.

[Printed, 10d. Drawing.]

A.D. 1863, September 21.—N° 2332.

VON KANIG, WILHELM ADOLF.—(*Provisional protection only.*)  
—"Improvements in railway telegraphs and signals, and also  
" in the permanent way and carriages, for preventing railway  
" accidents."

One part of this invention relates to preventing railway carriages from leaving the rails, and consists in placing in the centre of each truck a guard or safety rail, there being fixed upon each of the axles of each carriage a "double flanged guide wheel," which runs upon or above such rail, and the flanges of which "are of such a depth as to effectually prevent this wheel from leaving the guard rail by the impetus of the train in a lateral direction." The particular depth of these flanges may vary in accordance with that of the flanges of the carriage wheels, but must in all cases be of such depth that they will not rise above the guard rail even if the flanges of the bearing wheels should rise above the ordinary rails. These guide wheels will, moreover, serve to support the carriages in case of the breakage of any of the axles, and the guard rail may also be made to serve as a break rail, a "lever break" being connected to each carriage which may be let down upon the rail when requisite.

Another part of the invention relates to removing obstacles from the rails, and consists in placing in front of the engine of a train a blade "similar in form to that of a plough breast," such blade being bolted to arms which project over the rails, there being also between the arms a "strong catch net in a rocking or folding frame," and the arrangement being such that obstacles upon or between the rails will either be thrown to one side or the other of the rails, or received in the net.

[Printed, &c. No Drawings.]

A.D. 1863, September 28.—N<sup>o</sup> 2376. (\* \*)

LOWE, THOMAS.—"An improved break for railway and other carriages."

The apparatus is composed of "a spring bolt lever," "triangular lever," "toothed collar" on the axle, "pinion," "spindle," "toothed wheel," "central wheel," "vertical threaded shaft," "break band," and communicating wires. "The guard and driver have each under their control a spring bolt lever working in a notched quadrant; to these levers the other ends of the wires are connected. A bell is placed on each of these quadrants, which is sounded on either wire being pulled."

"The action is as follows:—Upon the guard pulling the lever in his compartment, the wire is caused to draw the upper leg of the triangular lever to one side of the apparatus, whereby the

" bolt is released ; at the same time one of the lower legs with the pinion is made to approach the toothed collar on the axle, into the teeth of which it engages ; the rotation of the axle and collar causes the pinion and spindle to revolve with the toothed wheel at its upper end, and also the central wheel, whereby the vertical threaded shaft is lowered, and the break band or strap applied. When the wire in the guard's compartment is acted on, the bell near the driver is sounded, thereby giving him notice to release his spring bolt lever. The same operations are performed by the driver when he wishes to apply the breaks."

" Electricity may be substituted for the bell arrangements for indicating the application of the breaks."

[Printed, 10d. Drawing.]

A.D. 1863, October 1.—N<sup>o</sup> 2403.

BONNEVILLE, HENRI ADRIEN.—(*A communication from Isidore Alexandre Moineau.*)—(*Provisional protection only.*)—" Improvements in railway and other breaks."

This invention consists in the employment, in combination with the ordinary mechanism, " of pulleys or polyspasts, and principally the differential pulley or pulley with variable diameters, for increasing the force and pressure of the break on the wheels of railway and other carriages."

A mode of applying the invention is described, in which a differential pulley is mounted upon an axis placed in suitable supports below the tender of a railway train, an endless chain passing into the grooves of this pulley, and also partially round an ordinary pulley, to the axis of which is connected a hook, which receives the first link of a chain passing longitudinally under the tender, and having connected to it about midway the upper end of a lever connected with break arrangements of the ordinary character. By turning the differential pulley in one direction the breaks are pressed against the wheels, while on turning it in the other direction they are released therefrom, this turning of the pulley being produced by means of a winch and suitable gearing. The " floating or loose part " of the endless chain passes round a " centre pulley," by which it is supported, and the longitudinal chain beneath the tender is apparently meant to be connected to other chains passing below the carriages of a

train, so as to actuate the whole of the breaks of the train simultaneously.

[Printed, *8d.* Drawing.]

A.D. 1863, October 1.—N° 2406.

BELL, JAMES.—(*Provisional protection only.*)—"Improvements in couplings for railway carriages."

According to this invention "the present right and left handed "screw couplings may be dispensed with." The inventor proposes to apply to each end of each carriage "a shank hook, with "an eye in each shank," such hooks being attached to the carriages by shafts in their enlarged ends, and such shafts passing through bearings, and being provided with toothed wheels, which, being actuated by pinions and crank handles, serve to turn the hooks, so as to cause one hook to gear with the next hook and eye, or to disengage it therefrom at pleasure, the "jolting," and frequent damage to fragile goods, arising from the ordinary system of coupling being thus avoided.

[Printed, *4d.* No Drawings.]

A.D. 1863, October 2.—N° 2419.

TORREY, WILLIAM AUGUSTUS.—(*A communication from Joseph Wood.*)—(*Provisional protection only.*)—"Improvements in lubricating the axles of railway carriages."

This invention consists in substituting for the cotton waste, which is in some cases placed in the lower parts of the axle boxes of railway carriages, in order to carry up the oil to the axles, shavings of wood, "by preference, those of pine," the reason for this substitution being that cotton waste "after a time becomes "charred, and it is then unfit for further use;" pine shavings not being liable to char, and having "sufficient capillary power "to bring up the oil as it is required."

[Printed, *4d.* No Drawings.]

A.D. 1863, October 6.—N° 2446.

DYER, GEORGE.—"Improvements in the construction of railway carriages."

This invention relates, firstly, to altering or changing the line of concussion, in order to lessen the tendency of railway carriages

to overturn or rise on end in the event of a collision, this being effected " by the application of additional buffers to the ends of " the carriages, fixed midway, or higher, between the bottom " framework and the roof of the carriage, or in some cases by " buffers so situated, and without the use of the ordinary buffers " at the extremity of the framework. The buffer springs may be " curvilinear flat compound steel springs, placed vertically against " the ends and sides of the carriages, the buffer bearing against " the centre or convex surfaces of the springs, and diagonal stays " should be placed at the front and end of each carriage frame to " take their proportion of strain ; or the ordinary buffer springs " may be used."

According to another part of the invention, the patentee proposes " to place the wheels at the sides of the carriages to bring " the centre of gravity within or between the wheels, and thus " prevent oscillation, and give increased steadiness and security " to the carriage."

Another part of the invention consists in making the wheels to " revolve on their axles instead of being fixtures thereto, so as " to prevent the danger attendant on travelling round curves, " and also to lessen the injurious results of oscillation upon the " nervous system of the passengers ;" the patentee also proposing " to increase the diameter of the wheels to about five feet, or " about equal to the base or breadth of the carriage, or less, as " may be required to resist the overhanging weight and tendency " to overturn ;" the carriage being, moreover, strengthened " by " forming an end of a strong vertical framework with diagonal " stays, so that in the event of a collision, the carriage would " have more power to resist its force and pressure, and preserve " the passengers from excessive injury ; in like manner the frame- " work throughout the carriage may be constructed on the " diagonal principle."

Another part of the invention relates to carriages and trucks adapted both for railways and common roads, and consists in placing the wheels at the sides of such trucks and carriages, and providing such wheels with a wide flange, so that " when not " running on the railway they may find a sufficient bearing on " common roads to sustain and carry the load. Shafts should be " attached to the trucks by hinged joints for the purpose of " harnessing the horses, and the shafts would be pushed back



" roller of large diameter, and about the width of the bearing surface of the axle. The exterior case is open at the lower part to admit the axle, and is furnished with side pieces to retain the axle directly under the vertical centre of the roller, which is in contact with the axle and forms its bearing." The roller is about twice the diameter of the axle; and the inventor states that by these means "the friction is considerably diminished, which is especially evident when the wheels are passing round curves."

[Printed, 4d. No Drawings.]

A.D. 1863, October 14.—N° 2523.

SMITHETT, RICHARD HUDSON.—(*Provisional protection only.*)

—"Improvements in the application of wheels to railway carriages."

This invention consists "in the application of a third pair of wheels to four-wheeled carriages, but which wheels are not intended to be running wheels or afford any support to the carriage, except in cases of accident or derangement of some of the four ordinary running and supporting wheels," such additional wheels being of smaller diameter and "narrower guage" than the ordinary wheels, and while the latter are sustaining the carriage, being about an inch above the rails. In case of breakage or other accident happening to the ordinary wheels, or the latter running off the rails, the additional wheels come down upon the latter and support the carriage. This arrangement may be varied by using additional wheels of the same size as the ordinary wheels, but placed upon axles which are higher than those of such ordinary wheels.

Although the guage of the additional wheels is mentioned as being less than that of the running wheels, this appears to relate to the distance between the flanges only, the "outside width" of the additional wheels being equal to that of the others.

[Printed, 4d. No Drawings.]

A.D. 1863, October 15.—N° 2530. (\* \*)

FLEXEN, STEPHEN.—"An improved apparatus for ventilating railway and other carriages, houses, buildings, steam and sailing vessels of all kinds, moveable or otherwise." The invention consists of "an apparatus in which a roller and pulleys or

“ wheels and lines, cords, gut, tapes, straps, or chains are combined as follows with a folding louvre ventilator placed at the upper part of a sash frame, window frame, or other similar frame, that is to say, I fix a flexible line, cord, gut, tape, strap, or chain (by one end) to each side of the bottom of the ventilator, and I pass the other end of each such line, cord, gut, tape, strap, or chain over a pulley or wheel, or pulleys or wheels, and I fix it to a roller towards the centre of the roller, such roller being placed immediately above the ventilator, so that when the roller is turned round for the purpose of raising the ventilator the said lines, cords, guts, tapes, straps, or chains attached to the bottom of the ventilator shall wind round the roller worm-like or spirally without entangling. I work or turn the roller by a cord, gut, tape, strap, line, or chain coiled round one end of the roller.”

The invention may be employed for excluding dust, and for stopping or regulating the passage of drafts of air, vapours, or gases into and out of houses, vessels, or carriages.

[Printed, 8d. Drawing.]

A.D. 1863, October 17.—N<sup>o</sup> 2537. (\* \*)

MEISEL, MORITZ.—(*A communication from Ludwig Starck.*)—(*Provisional protection only.*) — “ Improvements in apparatus for ascertaining the weight of the load supported by the springs of railway locomotives and carriages, for the purpose of regulating or equalising such load.”

“ For this purpose the apparatus is so portable that it may be readily applied on any part of a railway in order to ascertain the correct loading or otherwise of a railway carriage or locomotive, so that each supporting spring may receive its proper or equal burthen. By this means the weight or load may be so equally distributed as to prevent in a great measure the swinging motion of locomotives and carriages, thus effecting a great saving in wear and tear, and affording a greater security whilst running. The apparatus consists of a double-acting screw jack mounted on a broad foot plate, by preference of cast iron. The upward thrust of the screw jack acts against a compound spring, which it is preferred should be similar in character to a bearing spring of a railway locomotive engine, such spring being calculated to bear a weight or pressure equal or superior

“ to that of the springs it is required to test. At each end of the  
 “ spring an arm or hanger is suspended, and the lower ends of  
 “ such hanging arms project outwards, and are of suitable form  
 “ for receiving and supporting the rim or periphery of one of the  
 “ wheels of a locomotive or of a railway carriage when placed  
 “ underneath the same. The hanging arms are connected by a  
 “ jointed rod near their upper ends, and below by a rod (by  
 “ preference made of cast steel), having guide rollers mounted  
 “ thereon, which bear against the side of the screw jack acting so  
 “ as to guide the hanging arms in their up-and-down movement.  
 “ A dial marked with suitable divisions and having a hand or  
 “ pointer is mounted on a cross bar supported by arms carried by  
 “ the spring, the dial and apparatus being so arranged as to  
 “ indicate the weight or pressure placed on the hanging arms  
 “ when the screw jack is actuated to cause an upward thrust  
 “ against the under side of the spring to raise it and the apparatus  
 “ upwards with the wheel of a locomotive or of a railway carriage  
 “ bearing thereon. Arms or props are jointed or otherwise con-  
 “ nected to the apparatus which are brought to bear against the  
 “ wheel to retain the apparatus in a vertical position.”

[Printed, 4d. No Drawings.]

A.D. 1863, October 19.—N<sup>o</sup> 2557.

EYNARD, LOUIS. — (*Provisional protection only.*) — “ Improve-  
 “ ments in breaks for railway trains and other purposes.”

This invention consists in placing underneath each carriage of  
 a railway train “ a frame carrying a skid or break for each wheel,  
 “ combined with a spring fixed on each side of the carriage, such  
 “ springs being compressed by the frame in order to remove  
 “ the breaks from the wheels ” when liberated from the pressure  
 of the frame.

“ The mode of raising the frame so as to compress the springs  
 “ is by means of a central shaft or axis, suitably mounted in the  
 “ lower part of the carriage, by turning which shaft a cord or  
 “ chain (passing over guide pulleys) is wound on to the same,  
 “ the two ends of such cord or chain being connected to the  
 “ frame; and the frame is kept raised as required by means of a  
 “ ratchet wheel on one end of the said shaft, retained by a pawl  
 “ acted upon by a spring,” but this raising of the frame may be  
 effected by other means.

"The **pall** or other retaining mechanism is withdrawn as required by means of a rod extending the whole length of the carriage, which rod is caused to act on a cord or chain or other means of connection with the said pall or other retaining mechanism," the rods of the different carriages being "flexibly connected at their ends," so as to admit of their being acted upon simultaneously by the guard of the train.

These improvements may be applied to "detached carriages" as well as to "common road or other vehicles.

[Printed, 4d. No Drawings.]

A.D. 1863, October 23.—N° 2621.

NEWTON, ALFRED VINCENT.—(*A communication from James Millholland.*) — (*Provisional protection only.*) — "An improved mode of manufacturing railway wheels."

The chief object of this invention is to enable the tyres of railway wheels to be placed thereon when cold, the disadvantages attendant upon the shrinking of such tyres being thus avoided. "To this end the inside of the tyre is rolled in a bevilled roll, and the ring of the wheel is turned slightly conical to correspond thereto. After carefully boring out the tyre true and smooth, so that it shall measure, say, one-eighth of an inch less than the wheel centre, and boring conical holes therein to receive the ends of set screws that are tapped into the rim of the wheels, and radiate from the centre therefrom," the tyre is forced on by means of clamps until the set screws and jam nuts can be applied. The set screws acting upon an inclined side of the conical holes will, as they are drawn, tend to draw the tyre securely on the wheel, and will hold it firmly in position."

Uniformity of strain upon all parts of the tyre alike is mentioned as one of the advantages arising from this invention.

[Printed, 4d. No Drawings.]

A.D. 1863, October 24.—N° 2632.

POTTER, ARTHUR, and POTTER, WILLIAM PERCEVAL. — (*Provisional protection only.*) — "Improvements in railway waggons for the transfer of minerals and general merchandize."

This invention relates "to the building of railway waggons in  
 " separate parts, so that the bed and wheels form one complete  
 " part and the body another complete part." Each waggon bed  
 is to be provided with rails, grooves, or rollers, and with moveable  
 fastenings by which the body of the waggon may be secured when  
 placed thereon, as "also with one or more ratchet plates or toothed  
 " wheels for moving the body on or off the bed with a winch,"  
 the body of the waggon in effect forming "a complete waggon  
 " running on small rollers or grooved or flanged wheels," suit-  
 able for working in the grooves or on the rails or rollers on the  
 bed, and being thus capable of being moved upon or off such bed  
 with facility. Such bodies may be transferred from beds on one  
 line of railway to beds on another by the use of a platform of the  
 same height as the beds, and furnished with rails or grooves cor-  
 responding with those on the beds. "The bodies may also be  
 " transferred by means of a crane or other contrivance, and may  
 " also be transferred between a railway and lighters, rafts, or road  
 " waggons."

[Printed, 4d. No Drawings.]

A.D. 1863, October 24.—N<sup>o</sup> 2635. (\* \*)

ALISON, ALEXANDER.—(*Provisional protection only.*)—"Im-  
 " provements in atmospheric railways, and in carriages for the  
 " same."

The invention "consists in the use of an improved flexible  
 " valve in the air tube of ordinary atmospheric railways, in the  
 " novel construction of an atmospheric tunnel railway, and in  
 " carriages, the latter being also applicable to ordinary railways  
 " and tramways."

"The valve employed is constructed of gutta percha or other  
 " flexible material, and is so formed that it is raised up by the  
 " piston rod and returns immediately after the passage of the  
 " same. The piston rod being constructed flat, will not open the  
 " valve more than one-and-a-half inches, and as the pressure of  
 " the atmosphere will keep the valve tight, very little external air  
 " will enter the tube."

"The tunnel employed (when the tube is dispensed with) is  
 " constructed of any suitable material, and convenient size, for  
 " the passage of the train. Attached to the front of the first car-  
 " riage of the train is a curtain or piston nearly filling a section of

“ the tunnel. This curtain or piston is constructed of metal or wood, and moves on wheels with a guiding wheel running on a rail at the top of the tunnel. Though attached to the carriage the piston is freed from the oscillation of the carriage to which it is attached. To avoid any change, a piston may be attached to the last carriage. One or more doors are placed in each piston. By the opening of those in the front piston the vacuum will be at once destroyed, and by keeping those in the rear piston open the passenger carriages of the train will be continually supplied with fresh air. In addition to the ordinary breaks is used an accumulating power break, similar in form to the main spring of a watch. This spring is fixed to the axle of the carriages, and is wound up by the revolution of the wheels when it is desired to stop the train, and the accumulated force is exerted against the wheels in starting. The doors in the piston or curtain, as well as those communicating with the stations, are hung on their centres to prevent slamming and for convenience of opening. A stationary engine working large fans is placed at each end of the line and at such intermediate points as may be found desirable.”

[Printed, &c. No Drawings.]

A.D. 1863, November 6.—N° 2759.

NEILSON, WALTER MONTGOMERIE.—(*Partly a communication from Eugene Thétard.*)—“Improvements in axle boxes.”

This invention relates to the axle boxes of railway rolling stock, and is intended to prevent the access of dust thereto, and the escape of lubricating material therefrom, “notwithstanding wear of the parts.”

The main portion of the axle box, comprising the bottom and sides, is so formed that the brass which bears upon the axle journal, or the cover or casting to which such brass is attached, can slide vertically therein, a packing being applied to the parts to render them properly tight. The outer end of the box is so shaped as to enclose the outer end of the axle, the inner part of the box encircling a portion of the shoulder of the axle, a ring of leather or other suitable material forming a packing at this part. By these arrangements the box rests upon the axle independently of the main bearing brass, so that the wearing of the latter does not cause the axle to bear more strongly on the other close-fitting



parts of the box, the latter thus retaining their fit and tightness much longer. Those parts of the box which encircle the outer end and the shoulder of the axle are by preference lined with brass, and to prevent any tendency of the oil to work towards or over the shoulder a metal ring, turning with the axle, is applied to such shoulder. The lower part of the box is formed into a reservoir for lubricating material, which is introduced by means of a "capped inlet," and applied to the journal by a feeder which is pressed upwards by springs, and provided with fibrous matters, the capillary attraction of which raises such material. Or the latter may be applied to the journal by means of a roller or rollers mounted upon springs, and partly immersed in the lubricating material. And, if desired, a "reserve supply" of lubricating material may be placed in a separate receptacle mounted above the level of the axle, and furnished with an opening communicating with the bearing surface, and provided with a fusible plug, which upon the parts becoming heated melts, and allows the reserve supply to descend to the journal.

[Printed, 16d. Drawing.]

A.D. 1863, November 11.—N° 2798.

TESTUZ, FRANÇOIS. — (*Letters Patent void for want of Final Specification.*)—"Improvements in breaks applicable to railway "and other carriages."

This invention consists in the use of certain apparatus by means of which break blocks of the ordinary character "are brought to bear on the surfaces of the two wheels upon the same axle simultaneously from opposite directions." The break blocks are connected in pairs to beams or bars reaching from one wheel to the other, such beams or bars being hinged to and suspended from the frame of the carriage, one in front and one at the back of each pair of wheels to which the breaks are to be applied. Close to the inner side of each wheel is fixed a bracket carrying a pin or stud, these serving as the fulcra to two levers, and the latter being connected by means of tie rods to the break beams or bars, the levers being moreover connected by means of links or otherwise with a rod or bar, to which a backward and forward motion can be given by any suitable mechanism, the arrangement being such that on moving the rod or bar in one direction the breaks are applied to the wheels, while on moving it in the other direction they are removed therefrom; or such

removal may be effected by means of springs. Instead of rods or bars for working the levers, chains or ropes may be used, and the bar, or rod, or chain, or rope of one carriage may be connected to that of another by suitable means, so that the whole of the breaks of a railway train may be actuated simultaneously from one carriage. Where the wheels turn upon fixed axles, the pins or studs forming the fulcra of the levers may be fixed upon such axles instead of upon brackets as mentioned above.

[Printed, &c. No Drawings.]

A.D. 1863, November 12.—N° 2817.

DAVIES, GEORGE.—(*A communication from Augustus Ball Davis.*)

—"Improvements in springs for railroad cars, and other similar purposes."

This invention relates to the use of "one or more series or nests of springs, those of each nest being arranged side by side and free from contact with each other, and so confined within a box, or attached to or confined between plates, that the said nest or nests of springs shall with the said box or plates form a single self-contained car spring of a simple, cheap, durable, and efficient character."

The invention is described under a great variety of modifications, but the main feature of the invention consists in placing side by side in a suitable box or case a number of spiral or coiled springs, which are kept in their places by means of projections from the upper and lower parts of the box or case, and also by means of a central bolt which passes through the central spring. One part of the box or case is made capable of moving to some extent upon the other, so as to admit of play in the springs in a vertical direction, but at the same time prevent any lateral contact of such springs. If desirable, however, the box or case may be dispensed with, and the springs be mounted between plates only, and kept in position by rods, or by means of recesses in the plates into which the ends of the springs enter, all these details being capable of variation. Several advantages are mentioned as arising from the invention.

[Printed, &c. Drawing.]

A.D. 1863, November 19.—N° 2896.

ADAMS, WILLIAM BRIDGES.—"Improvements in wheels, tires, axles, and axle boxes, and modes of applying them."

This invention is set forth at some length, and under different modifications. One part of the invention consists in forming wheels hollow, so as "to contain oil or other lubricant below the " axle bearing," and also in certain arrangements of solid working within hollow axles, "the lubricant being contained in a " hollow of the axle of larger diameter than the bearing, to prevent leakage."

Another part of the invention includes various arrangements of wheel tires "for the purpose of permitting the tire to slip round " on the wheel to compensate the movement on two rails of different lengths." And the invention further includes improved spring tires, so contrived as to "give a rocking lateral movement and slight power of flattening to the tire when required, " to induce adhesion to the rail as well as power of slipping round " the wheel within the tire on curved lines of rails, to compensate " for varying paths." Also the formation of tyres with angular or other convenient sectional form of flanges, salient and re-entrant, to communicate motion with better adhesion, and likewise a mode of applying them to rails formed with re-entrant angles, the object being "to obtain better adhesion for heavy " loads or steep gradients." Also certain improved radial axle boxes "to enable wheels and axles to run either on straight or " curved courses, applied to inside or outside bearings, with flat " tops to take the spring shoes or rollers with or without knuckle " joints, or with rollers in the box top to facilitate movement, " the axle being either a fixture in the box or made to revolve " therein." Also, "the provision of curvilinear movement in " the bearing brasses of such radial axle boxes to compensate for " irregularities of form in the external radial surfaces when used " for rough vehicles." Also an arrangement for the radial bearing of the axle, "which may be fixed or revolving, to slide " radially through a metal frame working in horn plates in the " usual manner." Also a certain dovetail arrangement for the purpose of forming radial boxes "which may dispense with the " ordinary horn plates while giving curvilinear movement to the " wheels and axles, and to which, if the axles be fixed, the box " becomes merely a guide." Also, "the combination of inside " and outside radial boxes, either struck from one or two centres;" and certain improved axle boxes, adapted for use in combination with the other parts of the invention. The details of these

arrangements will only be understood with the aid of the Drawing annexed to the Specification.

[Printed, 1s. Drawing.]

A.D. 1863, November 20.—N° 2920.

KIRKMAN, GIARDINELLI SPOONER. — “Improvements in  
“ apparatus used for connecting railway carriages and trucks.”

In lieu of the hook ordinarily used at the end of the draw bar, the patentee uses “a pair of jaws formed on the inner faces with  
“ lugs of an annular shape,” the angle of such lugs being  
“ determined by the radius of the sharpest curve of a railway,  
“ over which trains of carriages or trucks may have to travel.” With this pair of jaws a hook is used, “the stem of which is  
“ swedged out horizontally and at right angles, and formed with  
“ lugs; the stem of this hook is passed into the cavity in the  
“ under carriage at the same angle as the lugs on the jaws. The  
“ stem of this hook is then passed round, so that the lugs on  
“ the hook may come in contact with the rear of the lugs formed  
“ within the jaws. The swedged parts of this hook, as it is  
“ passed into position, come in contact with and press against  
“ two bolts or rods, one on either side;” the ends of these bolts passing through eyes which retain the ends of the chains, and such bolts being pressed against the swedged parts of the hook by springs. “By this construction and combination of parts, in  
“ the event of any carriage or truck running off the line of rails  
“ and assuming an angle with the next carriage or truck greater  
“ than would be required to pass round the sharpest curve, the  
“ hook will be separated and drawn from between the pairs of  
“ jaws, and the bolts which secure the ends of the safety chain  
“ will be moved back, and the carriage or truck will be disconnected from the next carriage or truck.”

[Printed, 10d. Drawing.]

A.D. 1863, December 1.—N° 3007.

GARDINER, PERRY GREEN.—“Improvements in railroad car  
“ springs.”

This invention consists “in the manner of using and applying  
“ the elastic compressible qualities of natural or raw wool in combination with springs of steel in a spiral or circular form, and

"operating together in a cell or cells, so as to form a spring sufficiently strong, durable, and elastic for railroad cars." The patentee states that other animal or vegetable fibrous substances, such as hair or cotton, may be applied in a similar manner, but that he considers wool to be preferable, as being the most durable and elastic.

Different modifications of the invention are described, in one arrangement a number of spiral springs being placed within a shell or case, formed into a number of cells, each of which contains one spring, the case being provided with a cover or top which is capable of moving up and down, and each spring having packed or compressed within it a quantity of wool, both the latter and the springs forming an elastic support to the cover, and such cover being provided on its inner surface with cylinders filled by plugs of wood, which bear upon the springs. In another arrangement projections on the lower side of the cover serve the purpose of the cylinders and plugs, a bolt in both arrangements passing longitudinally through the case and cover, and assisting to keep the parts in their relative positions. The springs are of different heights, so as to come into action one after another according to the amount of load laid upon them.

[Printed, 6d. Drawing.]

A.D. 1863, December 4.—N° 3051.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from Donald Bethune.*)—"Improvements in working railway breaks."

This invention consists "in making the breaks now in ordinary use self-acting," or capable of acting without the aid of the guard or other attendant of a railway train. To one of the hinder carriages of the train is attached an iron or other bar, which passes forward from this to and below the carriage next in advance of it, being capable of sliding to and fro in a suitable box or case under the latter. To this bar are connected chains, some of which pass directly from the bar to break blocks which are suspended behind the wheels of both carriages, while others pass round guide pulleys and are connected to break blocks suspended in front of the wheels, the arrangement being such that on a tendency arising in the hinder carriage to overrun that in front of it, the bar so tightens and acts upon the chains as to press all the break blocks against the wheels of the carriages. Similar appa-

ratus may be connected to all the carriages of a train, and thus upon checking or stopping the progress of the engine of the train, all the breaks may be brought into action simultaneously, or nearly so, the effect being increased if desirable by the use of breaks mounted upon the engine and worked by hand, the breaks being released from the wheels on the engine resuming its ordinary rate of progress, and the carriages their proper distance from each other.

[Printed, *8d.* Drawing.]

A.D. 1863, December 8.—N<sup>o</sup> 3083.

AUBERT, JEAN.—“Improvements in railway carriage and other “brakes.”

The “peculiar feature” of this invention is, “that the brake is “worked by the locomotive itself, for as soon as the steam is shut “off from the cylinders of the locomotive the propelling force “which is accumulated in the train causes the putting on the “brake to the wheels.”

The locomotive carries a shaft, mounted in suitable bearings at its hinder end, and kept in constant rotation during the working of the engine by means of connecting rods and cranks, there being also on this shaft cams, which, by the turning of a screw, may be at any time brought into action upon a piece of mechanism called a nut, the movement of the latter by the cams causing a corresponding movement of apparatus by which brakes are pressed against the wheels of the engine. And in order to bring into action the brakes of the carriages also, the nut is also connected by means of a chain with an arrangement of levers and rods, through the medium of which longitudinal shafts mounted below each of the carriages are caused to partially rotate, this movement causing arms on these shafts to operate upon certain levers and rods, some of the latter being so arranged as to form what are known as toggle joints, and the result being that brake blocks are forced against the inner portions of each carriage wheel.

The longitudinal shaft of one carriage is connected with that of another by means of couplings and keys, so contrived as to be capable of adapting themselves to curves or gradients in the rails. The details of the invention are somewhat numerous; the screw mentioned above being turned by means of an endless chain and a winch and pulleys, a pawl and ratchet maintaining



the pressure of the brakes when applied, and an indicator being employed in connection with the apparatus turned by the winch which shows the amount of pressure being exercised.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, December 16.—N° 3182.

FELL, JOHN BARRACLOUGH. — "Improvements in railway engines, carriages, and permanent way for steep inclines."

This invention relates principally to improvements upon the invention for which a patent was granted to the present patentee, January 26, A.D. 1863, No. 227, and consists in the first place in a mode of arranging the horizontal traction wheels forming part of that invention, and so driving and connecting them "that each pair of wheels shall keep relatively the same position to, and help each other over the dead points or centres." This is effected by the use of two connecting rods, the end of one being jointed to a crank on the axis of one of the horizontal wheels, and receiving motion from one piston, while one end of the other connecting rod is jointed to a crank on the axis of one of the wheels driven by the other piston, the opposite ends of these connecting rods being jointed to one and the same block, which slides in guides placed in a line parallel to the motion of the pistons. Or the same effect may be produced "by connecting each piston to a supplemental crank shaft."

Another part of the invention relates to arrangements for giving motion to the horizontal traction wheels by means of one cylinder, and consists in placing the cylinder in the centre and fixing a cross head upon the end of the piston rod, and in jointing the connecting rods to the ends of the crosshead, so that when on the centre the connecting rods will be in a line drawn parallel to the middle rail, and passing through the axis of the horizontal traction wheels.

Another part of the invention relates to modes of driving both the horizontal traction wheels and the vertical carrying and traction wheels by one pair of cylinders, and is described under different modifications.

The invention further includes the dispensing with the flanges of the horizontal traction wheels, and in using check or guard blocks, which are fixed to the framing of the engines and carriages, so as to pass under the flanges of the traction or middle

rail. Also a mode of applying brakes directly to the middle or traction rail, with or without springs; such brakes being pressed against the rail either by screws or levers, and being made in some cases to serve both as brakes and check or guard blocks. Also a mode of supplying sand to the traction rail when in a slippery state, such sand being thrown against each side of the rail by a jet of steam or water, or by rotating blades. Also the use of wrought-iron centre or traction rails, fixed on wrought-iron chairs, one form of rail, however, being described which does not require chairs.

The Provisional Specification also mentions the use of grooved rollers or cutters for clearing the rails from ice, and the use of wedges actuated by screws for compressing the traction wheels against the rail, but these particulars are not mentioned in the Final Specification.

[Printed, 2s. Drawings.]

A.D. 1863, December 18.—No 3195.

ADAMS, WILLIAM BRIDGES.—“Improvements in locomotive engines and trains for railways, tramways, and common roads.”

This invention is described at some length, and under various modifications, and consists, in the first place, in constructing a locomotive engine with a “bending frame,” and an arrangement for communicating motion from one wheel to another, “that is to say, by upper wheels connected by their peripheries to lower wheels of unequal or equal diameters, or vice versa;” or with a rigid frame, or a frame in two parts bolted together; the object of the “bending frame” (which is in effect a frame formed in separate parts jointed together) being to facilitate the passage round curves in the rails. The “upper wheels” are wheels mounted so as to be in contact with some of the driving wheels of the engine, and also in contact with the other wheels of such engine, or with those of the tender, or of other vehicles. In one arrangement the driving wheels of the engine are without flanges, in order to reduce friction on the rails. Arrangements are also set forth in which such upper wheels are used to communicate motion to “radial wheels with radial axle boxes, or to separate tenders or frames with radial bars,” “or to the wheels of pivotted bogies or trucks, so that the connection may be as complete on curved lines as on straight, the connecting wheels

"being a substitute for side or connecting rods, which are only adapted to parallel axles and straight lines." This part of the invention also includes a construction of engine "with two or four or more coupled central wheels, and with end wheels in radial axle boxes and a rigid frame, which for convenience may be made in two parts to bolt together."

Secondly, the invention consists in the construction of carriages "with radial end wheels and two or more central rigid or sliding wheels, in one solid frame, or on two frames bolted together, for convenience of transit when not on rails."

Thirdly, in certain arrangements of engine and carriage brakes, "which will follow the wheels whether on straight lines or curves." A "carrying bar" is mounted upon a bearing in the centre of each axle, this bar carrying at its ends round bars which are parallel with the axle, and from which descend levers carrying the brake blocks, while other levers ascend from them to which are connected longitudinal rods, by moving which the brakes can be applied to and removed from the wheels at pleasure; steam power, or the action of friction wheels, being used to operate such rods, and the rod of one carriage being connected to that of another by suitable means.

The invention further includes a mode of constructing waggon without steel springs, the wheels revolving upon a fixed axle, and the latter being connected to pedestals which are bolted to the sole bar, a block of india-rubber being (if desirable) placed between the pedestal and the sole bar, and the frame being cut away above the sole bar, causing the latter to form a wooden spring. Also the construction of waggons with radial axle-boxes curved in opposite directions, and which may have also two or more rigid or sliding central wheels; also a mode of obtaining "radial movement of wheels and axles, either one pair or two pairs, grouped by radial plates or bars;" and, also, a mode of using liquid fuel or petroleum "by injecting it in fine streams with compressed air or incandescent substances;" all these particulars being fully set forth.

[Printed, 1s. Drawing.]

A.D. 1863, December 18,—N<sup>o</sup> 3196.

SAUNDERS, ROBERT.—"Improvements in the construction and building of portable cottages or houses and other buildings."

This invention is in part applicable to the construction of railway and other carriages. Grooved standards or uprights are so arranged as to receive the edges of panels or sections which form the sides and ends of the structure, such panels or sections being composed by preference of two sheets of iron, joined together by overlapping the edge of one with the edge of the other, there being a space between them which is filled by a packing of cocoa-nut waste or other non-conducting material. The upper ends of the standards are connected together by a band of iron, and such other supports introduced as may seem requisite, and the roof is formed in a similar manner to the sides and ends, the panels being supported by angle or other iron, and the joints being capped to prevent leakage, the whole resting upon a foundation of cast iron or other suitable material.

In the application of the invention to the construction of portable houses and other similar structures, the lower ends of the standards are supported by a foundation, which may be composed either of iron or of stone, brick, or other available material, and the panels may be composed of slate, stone, wood, or other materials, such panels being if necessary so arranged that the lower edge of one overlaps the upper edge of that next below it.

Different modifications of the invention may be adopted, according to the purpose for which the structure is intended.

[Printed, 10d. Drawing.]

A.D. 1863, December 30.—N° 3299. (\* \*)

HOUDAYER, MAXIME CHARLES EDOUARD, and CORMIER, JULES JEAN. — (*Provisional protection only.*)—"An improved apparatus to be attached to locomotive engines for the purpose of removing obstructions from railways."

"The apparatus consists of two strong cheeks of sheet iron, or other suitable resisting material, connected together on a suitable iron frame fixed to the beams and the buffer or cross bar of the engine; the said cheeks form a sort of protruding wedge, the angle of which is situated in the prolongation of the axis of the engine, the faces of the wedge forming either straight or suitably curved inclines both in the vertical and horizontal direction, whilst the two free ends of the wedge extend sufficiently far beyond the rails, the lower edge of both cheeks nearly reaching these latter, which lower end is bent up into

" the horizontal direction so as to act in the manner of a shovel  
" for lifting any obstacles existing on the track in front of the  
" engine, and throwing them aside. The free end of each cheek  
" may be prolonged parallel to the outside of the locomotive."

[Printed, 4d. No Drawings.]

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1864.

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A.D. 1864, January 7.—N° 48.

**RAMSBOTTOM, JOHN.**—" Improved machinery and apparatus  
" to be employed in and improved modes of manufacturing hoops,  
" rails, and other articles of cast steel."

This invention consists, firstly, " in a hood or shield which is  
" placed over the hot ingot of steel to retain the heat, and also to  
" prevent injury by unequal cooling; or in placing the ingot in a  
" metal box on wheels or otherwise, which box is then filled, and  
" the ingots covered with sand or other non-conducting sub-  
" stances to retain the heat while they are conveyed from one  
" part of the works to another."

Secondly, in the application of a revolving cutter or rasp for  
removing the external portion of the ingot when porous, or when  
otherwise requisite. This cutter or rasp consists of a rotating  
drum in which are slots for the reception of knives or blades, the  
drum being so placed that the knives or blades project slightly  
above the floor of the room in which the ingot is operated upon,  
the ingot thus having the porous or external part removed and its  
weight adjusted.

The invention further includes the employment of sawing  
apparatus for dividing a crude solid ingot into discs such discs  
being then " hammered circumferentially and on the flat sides to  
" condense the metal." this being effected either by the use of a  
steam hammer of the ordinary construction, or by means of a  
duplex steam hammer, the hammer heads of which fit into hammer  
blocks which run upon wheels, as described in the Specification  
of the Patent granted to the present patentee on the 13th of April,  
1863, No. 924, punches, and a conical mandril and strut being  
also employed in carrying out the invention.

The patentee describes the invention solely with reference to the manufacture of railway tyres.

[Printed, 1s. 4d. Drawings.]

A.D. 1864, January 14.—No 105.

**PLUM, THOMAS WILLIAM.**—"Improvements in forging, rolling, " and shaping iron, and other metals, and in tools employed " therein."

This invention relates to making solid or weldless tyres for railway and other wheels by means of coils of iron, according to the Patent granted to Charles Cowper on the 23rd of May, 1850, but such coils being in the present invention composed of bars of different form from those set forth in the Specification of that Patent, and being so shaped before coiling "as to be when " coiled either slightly convex or obtusely angular on one or " both of their sides, or of such form wholly or partially curved, " wholly or partially angular, or a combination of curve and " angle, of curve, angle, and flat, of curve and flat, or angle and " flat, as may be preferred or found most suitable for attaining " the object of having the inner edges or some point (the centre " preferred) between the inner and outer edges in welding contact " before one or both edges are closed." Bars may also be used which have a groove on one side and a tongue on the other, "or " with corresponding curve or angle or other similar interlocking " section." Such bars may be arranged in circular piles for the production of circular blooms for solid tyres, materials of different qualities being if desirable combined in one pile. A bar of one or other of the forms alluded to may be coiled round a mandril, and the coil thus formed be then cut through by sawing or other means, and so converted into a number of separate rings, the ends of which may or may not be welded together, but a pile of such rings being then heated and welded together either by hammering or pressure. Rings of different materials may thus be united together, and a tyre may thus be formed with a flange and outer rim of tough iron, the centre or head of the tyre being of hard iron.

In casting rings or ingots for wheel tyres and other ring-shaped articles of steel, Bessemer steel, Bessemer iron, or other metal, the patentee casts them much thicker than the finished ring is intended to be, and much wider, thus allowing for the reduction which takes place by hammering or pressure, and also for the



formation of a flange, the latter not being formed in the casting.

The invention further relates to arrangements connected with the fixing of armour plates upon the sides of ships and batteries, which do not require notice here. And the last part of the invention consists of an improved hammer, the block or top of which is provided with a well hole, formed vertically through it for the purpose of admitting a guide rod which serves as a mandril, and may be of any suitable shape for producing the required internal figure of the ring or other article under operation. This mandril is secured to the hammer block by a pin or latch or other suitable contrivance, so as to admit of its removal therefrom when requisite.

The invention may be applied to the manufacture of boxes, guns, and other articles, in addition to wheel tyres.

[Printed, *sd.* Drawing.]

A.D. 1864, January 16.—N<sup>o</sup> 119.

GILL, JOHN.—(*Provisional protection only.*)—"Improved means of destroying momentum and restoring it in the opposite direction, applicable to reciprocating movements in the steam engine, and printing and other machinery, as well as for buffers of every description."

The apparatus employed for the purpose of this invention consists of a hollow metal cylinder, closed at one end, and having within it a piston, which, being acted upon, compresses the air in the cylinder, "the expansive force of which will then reverse the motion and restore in the opposite direction a momentum equal (except in so far as affected by the friction of the parts) to that which had just been expended in the previous forward motion."

The invention is mentioned as being applicable "for railway and all other kinds of buffers," as also to printing machines, presses, ships, steam engines, and other purposes. The details of the invention may be varied, an aperture being in some cases formed in the piston, or in the end of the cylinder, so as to allow the compressed air to gradually escape during compression. Or the cylinder may be formed so as to constitute two chambers, the air being driven out of one into the other. And the piston may be furnished with a valve, so arranged as to facilitate its being drawn back to its original position.

[Printed, *sd.* No Drawings.]

A.D. 1864, January 18.—N° 133.

BECKMAN, CHARLES AUGUSTUS.—(*A communication from Wilhelm Basson.*)—"Improvements in bearings for the axles of " railway carriages, and in machinery for constructing parts of " the same."

According to this invention the bearings of the axles of railway carriages are so constructed that "the neck of the axle is enclosed " in a box made in two parts bolted together." On the neck of the axle rests a brass, capable of rocking endwise, a rib being formed in the interior of the upper part of the box which serves as a pivot for the brass, a leather ring forming a packing between the box and the axle. The lower part of the latter contains the lubricating apparatus, which is composed of a tray containing oil, and a frame consisting partly of wood carrying a large wick or a mass of loose fabric, the frame being pressed upwards by springs, and the axle being constantly fed with oil by the wick or fabric, and the latter being prevented from spreading unduly by spring pieces. The oil which drops back from the axle is received by troughs which are so perforated as to allow the oil to pass, but retain "any solid impurity unless it be very light or small in size." From these the oil falls into a gutter formed of porous material, this retaining any remaining impurities, the clear oil passing back so as to be again used. The groove in which the leather ring is fitted is provided with a passage which allows any oil which may accumulate in the groove to flow back. The brasses are not bored to the same shape as the neck of the axle, this reducing the friction when the wheels are passing round curves, and a mode of boring such brasses is described in which the brasses are fixed on a suitable support, and operated upon by a boring head driven by an axis, to which it is connected by a ball and socket joint, the cutter carrying the boring head being "caused to roll whilst in " action to the same extent as it is desired that the axle should " be able to roll in the brass."

[Printed, 1s. 4d. Drawings.]

A.D. 1864, January 19.—N° 140.

JENNER, GEORGE.—"Improvements in the construction of sun " blinds for railway and other carriage windows, or for other " similar purposes."

This invention consists in the roller of the blind having a band, cord, or chain at each end, passing either over sheaves attached to the roller, or over the roller itself and under pulleys placed below the level of the rod of the blind when fully drawn down, such rod being attached to the bands, cords, or chains, and the result being that upon pressing the rod either upwards or downwards the roller and blind are moved, and the latter "will remain stationary" at any height." When sheaves are applied to the roller they may be furnished with pins or studs, upon which the bands, cords, or chains may work, and be thereby prevented from slipping, but when sheaves are not used the bands, cords, or chains are fastened to the roller itself. The pulleys, bands, or chain, and the roller, are enclosed in a casing, in the upper part of which is a "chase," through which the blind passes, a corresponding "chase" on each side guiding the ends of the rods, which are flattened to fit therein.

[Printed, 4d. No Drawings.]

A.D. 1864, January 22.—N<sup>o</sup> 180.

SMITH, GEORGE, the younger. — (*Provisional protection only.*)  
—"Improvements in wheels for locomotive engines, carriages to  
"be used on railways, and similar purposes."

According to this invention the main body of the wheel is composed of radial or disc plates, the outer edges of which enter grooves or recesses in the inside of the rim or tyre, whilst their inner edges, or those nearest the centre of the wheel, fit upon a metal collar or ring, the inner face of which is slightly rounded, and is mounted upon an elastic ring placed upon a metal boss keyed to the axle or shaft of the wheel. The circumference of this boss is made slightly concave, in order "to allow of the  
"springing of the steel hoop thereon," the hoop being in contact with the two ends of the boss only. A certain amount of elasticity is thus imparted to the wheel, railway wheels being thus, moreover, enabled to rotate independently of each other in passing round curves in the rails.

[Printed, 4d. No Drawings.]

A.D. 1864, January 23.—182.

CLARKSON, THOMAS CHARLES. — "Improvements in ordnance,  
"and in applying certain cylinders and tubes for forming pro-

"jectiles and recoil springs, which improvements are applicable  
"for forming vessels for war, and pillars in deep water."

One part of this invention consists in applying iron, steel, or gun-metal cylinders, either formed by coiling round a mould sheet steel, or otherwise, by which means spring tubes are formed which are "applicable to fit into a solid tube for discharging  
"shot." Before placing such a tube inside a solid tube or gun, however, the spaces between the coils are filled with liquid cement, india-rubber, or other elastic material, such material being introduced and solidified by hydraulic pressure, india-rubber, moreover, being mineralized or vulcanized by the application of heat. Such an arrangement is mentioned as being applicable to the prevention of recoil not only in guns, but also in moving bodies, such as railway waggons and carriages, in this case an internal cylinder being provided with a buffer head, and acting as a plunger upon a coil formed as mentioned above. Different modifications of such an application are described, the details of this part of the invention including an oil packing, a certain ring to prevent the plunger "getting," and which allows the buffer head to revolve when unevenly struck, and a toothed rod or flange which in concert with a "ratchet cog" prevents any injurious recoil of the parts after an extraordinary concussion. The invention is illustrated by drawings, which are alluded to in the Specification by means of various figures of reference, none of which figures, however appear in the drawings.

[Printed, 2s. 4d. Drawings.]

A.D. 1864, January 27.—N<sup>o</sup> 231.

GRAFTON, SIDNEY.—"Improvements in apparatus for aiding  
"or assisting persons in entering and alighting from vehicles."

This invention relates to the application of "travelling hand-  
"holds" to the roofs and other parts of vehicles, such as railway carriages or omnibuses, and consists in "the application of longitudinal rods or supports, on which are placed pulleys to run  
"thereon; from the axes of these pulleys depend handles suitable  
"for a passenger to take hold of and steady himself in walking  
"along in the vehicle, as in walking up the centre of an omnibus,  
"the passenger holding the handle while the pulley runs along  
"the rod. When the handle is released it runs back to the  
"position from which the passenger brought it by reason of the

" inclination of the bar or support on which the pulley is supported. Instead of inclining the bars and causing the handles to return by their own gravity, india-rubber or spiral springs or cords with weights suspended over pulleys may be employed to return the handles to their normal position when released by the passengers." In order that passengers may also assist themselves in the opposite direction the patentee employs "two bars and pulleys with handles, the one bar being inclined in the opposite direction to that of the other, so that the handles gravitate and travel of themselves to opposite ends of the vehicle. More than two bars may be used, but if so they may be of less length and with handles traversing from the door to an intermediate point in the length of the vehicle, while another bar and pulley conveys you from mid-length to the further end, and vice versa."

Instead of rods for carrying the pulleys and handles, projections or ledges from the roof may be adopted, the object being to carry the traversing handle in such manner that it is not necessary to release it until the passenger has arrived at his or her seat in the vehicle. The handles may be of various kinds, and it is not absolutely necessary that pulleys should be introduced into the apparatus, as with sufficient inclination and smoothness of the rods a metal strap having the weight of the handle hanging on it will, by reason of the jar of the vehicle, gradually traverse towards the lower end of the supporting rod. It will also be readily traversed by the hand in use, and will steady the passenger as required.

The details of the invention are minutely described.

[Printed, 8d. Drawing.]

A.D. 1864, January 28.—N<sup>o</sup> 237.

RODGERS, JOSEPH.—"Improvements in the construction of railway and road wheels, of road wheel arms or axles, and also of pulleys and drums."

This invention has for its object the increased durability of the tyres of railway and other wheels, and of drums and pulleys, and also the easy removal and renewal of the axle-tree bushes and bearings of common road wheels.

Various methods of effecting these objects are set forth. In railway wheels the rim is formed with a recess in that part which

comes under the "tread" of the tyre, there being placed in this recess, either in a heated or a cold state, a single or double hoop of wood, composed of a piece or pieces curved or bent from straight lengths to the required diameter, and spliced or "jump-jointed" together. The spokes are formed "in the V-shape" usual in railway wagon wheels," a packing of wood being inserted between the contiguous arms of the spokes. Or such spokes may be of various sections, rectangular, oval, parabolical, or otherwise, the boss or nave of the wheel being of cast iron, and the packing between the arms passing for a short distance into the nave or boss. The tyre may be shrunk upon the recessed rim in the ordinary manner, the wooden hoop or hoops projecting above the same; or in wrought-iron wheels the tyre may be recessed and fitted with a hoop or hoops.

For road wheels a similar arrangement of spokes and rims may be used; or the packing between the spokes may be omitted; or where a broad wheel is required the patentee uses two broad thin plates, the lower one being attached to the rim of the wheel, and having a wooden hoop or wooden hoops fixed on the central part, the other plate being placed outside such hoop or hoops, two rings of iron being placed at the external edges of the latter, and an ordinary tyre shrunk on the whole. The axle box of such a wheel may be composed of a wrought-iron tube, having the outer end closed and the inner end screwed, internally by preference, to receive a nut which prevents the escape of the oil. On the middle of the bearing is placed a collar, and the second bush or bearing receives the extreme end of the axle or bearing, "a neat compact" axle box" being thus obtained. The bush or bushes being separate from the box may readily be removed, and are provided with lugs, recesses being cut in the axle box to enable them to enter, and the bushes being secured in the box either by keys or by recesses adapted to the lugs, or by both methods. The bushes may be of cast iron, chilled or otherwise, of other metal, or of an alloy, "grooves being cut on the external surface of the axle box" or that portion where the nave or boss is required." These arrangements are more especially adapted for common waggons but for superior vehicles a tube is used as in the other case, a flanch being provided on the periphery of the tube, and furnished with recesses to receive the ends of the spokes of the wheel, such spokes being pressed against the flanch by means of a cap, the latter being bored out to receive the arm or axle, and a plate being



placed between the end of the tube and the cap, escape of oil being thus prevented. Various modifications of these arrangements are described.

Drums and pulleys are constructed in halves or quarters, bolted together either with or without a packing of wood, and covered externally with a hoop or hoops in a manner similar to that already described with reference to railway and other wheels, each half or quarter of a drum or pulley being composed of wrought iron, stamped, pressed, or forged in one piece. "By this method a light framework of iron only is requisite."

[Printed, 1s. 6d. Drawings.]

A.D. 1864, January 28.—N<sup>o</sup> 239.

HENSON, JAMES.—(*Provisional protection only.*)—"Improvements in the construction of railway goods waggons."

According to this invention the whole length of the sides and roofs of the waggons are to be made "so as to roll back in or upon grooves or quadrants, or upon rollers or racks," or otherwise, so that "the said sides may be made to lift or be run up and down in sliding or folding form," and such sides to be made of "sheet or corrugated iron, or of metal, wood, and other substances in combination." The object of the invention is to afford facility for loading and unloading the waggons, both sides of which may be opened and closed simultaneously along with the whole or a portion of the roof, the latter being formed by the sides being carried up so as to meet or overlap in the centre. Both sides and roof are meant to be fireproof, and be fitted with locks or other suitable fastenings for securing the contents of the waggon.

[Printed, 4d. No Drawings.]

A.D. 1864, January 30.—N<sup>o</sup> 256.

BURR, DAVID AUGUSTE.—(*A communication from Richard Vose.*)—(*Provisional protection only.*)—"Improvements in springs for railway carriage and other purposes."

These improvements relate in the first place "to the use of peculiar end caps or heads for the purpose of securing and confining the ends of curved spring plates in the construction of springs," such end caps being hollow or open from end to end, and provided with exterior pockets or recesses which receive the

ends of the upper and lower bearing plates. The ends of the interposed tension plates, which complete the spring, pass through these hollow caps, and are bent back sufficiently to embrace the outer edges thereof, the elasticity of the tension plates holding the caps securely against the ends of the bearing plates.

A second part of the invention consists in the construction of a tension plate, or tension plates, with two or more bearing plates, "in such relative positions that the bearing and tension plates shall respectively yield or spring under the influence of pressure in planes at right angles to each other."

Thirdly, the invention consists in the interposition of a packing of india-rubber, gutta percha, wool, felt, or other elastic, gummy, or fibrous material between the ends of the elastic plates forming an elliptic spring. Such a spring may be pivoted centrally in the upper and lower bearings.

Different modifications of the invention are described, in some cases "solid head pieces" being substituted for the hollow end caps mentioned above.

[Printed, 4d. No Drawings.]

A.D. 1864, January 30.—N° 262.

CLARK, WILLIAM.—(*A communication from Claude Puriqot and Antoine Grivel.*)—"Improvements in railway break apparatus."

This invention relates to an improved skid break for railway carriages, which may be used either as an ordinary break for stopping trains, or as a self-acting skid in case the couplings give way, thus preventing carriages from running back in case of such an accident occurring on an incline. This break is so contrived as to act as a skid when the carriage is travelling in one direction, and as a break in the other, and such a break may be applied at each side of each wheel of a carriage, and may either be mounted upon the same shaft or upon separate shafts, being raised and lowered by means of metal blocks furnished with inclines, and connected with levers and rods, suitably arranged; or they may be actuated by chains passing round barrels mounted in bearings under the carriages, and connected to coupling bars, different modifications of the details of the invention being described.

The invention also includes the use of a "disc signal," which may be fixed at each end of a van forming the last vehicle of a train, this disc signal being so arranged in combination with the

break apparatus as to indicate to a following train that a part of the first train has become detached from the rest and is standing upon the line, or that the first train has been stopped through some accident. The break blocks may be composed of different materials, and of such forms as may seem best adapted to the carriages to which they are to be applied, one block being described as being suitable for acting at a crossing, and being composed of three parts, one part being fixed to certain levers, and a second part being also bolted thereto, with a frictional surface between the two, it being apparently meant that both the "line rail" and "guard rail" shall be operated upon.

[Printed, 1s. 4d. Drawings.]

A.D. 1864, February 3.—No 287.

WEBB, FRANCIS WILLIAM. — "Improvements in tools or 'machinery for cutting or shaping metals and other materials.'"

This invention is stated to be "particularly applicable for "shaping the inner rims of railway wheels," and it consists in the first place in connecting a cutting tool with a lever, "the fulcrum of the lever being adjustable as well as the distance "between the fulcrum of the lever and cutting tool, and in "giving reciprocating motion to this lever, so that the cutting "tool will oscillate in the segment of a circle, and form a cut or "curve corresponding to the radius of the cutter from the "fulcrum of the lever, the article being fed forward after each "cut to bring fresh surface to be operated upon."

Another part of the invention consists in causing the tool to rotate or partly rotate upon an axis having its bearing in the lever which gives motion to it, so as to round off corners in the article operated upon.

The improvements may be combined with slotting and shaping machines, the lever carrying the cutter being actuated by a rod connecting it to the reciprocating slide or ram of the machine. Thus the inner rim of a railway wheel may be shaped by the wheel being placed upon the table of a slotting machine, and rotated so as to bring forward a fresh surface after each cut; or a special machine may be arranged for this purpose by combining the slotting machine table with the lever carrying the cutting tool worked by a crank.

[Printed, 1s. 4d. Drawings.]

A.D. 1864, February 5.—N<sup>o</sup> 308.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Alfred Charles Fleury.*)—"Improvements in breaks for railway " and other wheels."

This invention "is applicable to the axles or spindles of locomotives, wagons, steam and hydraulic engines, to fly wheels " and driving pulleys, as well as to the wheels of carriages, that " is to say, that in every vehicle, apparatus, or appliance in which " an axle or spindle turns, this break is applied to the axle or " spindle, and that in every vehicle, apparatus, or appliance in " which the spindle is stationary the break is applied to the wheel, " pulley, or other moving part."

An arrangement is described as being suitable for a railway waggon in which there is fitted upon one of the axles of the waggon a toothed disc, a block being mounted above it which is capable of sliding up and down, a spring tending at all times to press it downwards, but being prevented from doing so until requisite by a chain or cord attached to a bar which may be placed in any desired position, and actuated by the hand or foot by means of a second chain or cord passing round certain pulleys. The bar slides in a guide, and it and the block are held up when raised by means of a catch, which on being disengaged allows the block suddenly to descend and enter between two of the teeth of the disc, thus stopping the rotation of the axle, which in this case has the wheels fixed thereon, the movement of the wheels thus being stopped also. A sliding bolt is so mounted under the carriage that on the descent of the block it enters a hole in the latter, and so prevents it from being forced away from the disc by the teeth of the latter.

Such a break may be actuated by steam, which may be caused to act upon a wheel so as to turn it in either direction at pleasure. " In locomotives the bar would be furnished with a slide arranged " to act as a steam-cock, and with a second slide which will open " the cock for the escape steam to assist in stopping the train," and the break " may be fitted to each wheel of the locomotive, " and to the last carriage, with communication, if desired, between " the bars by electricity."

In the case of a vehicle having a fixed axle with the wheels revolving thereon, the disc is not attached to the axle but to the nave of one of the wheels.

[Printed, 1s. Drawings.]

A.D. 1864, February 6.—N° 321.

FLETCHER, HENRY ALLASON.—“Improvements in locomotive engines and tenders, and in the working of the same, parts of which improvements are also applicable to railway carriages and waggons.”

This invention consists in the first place in “working the valve gearing of locomotive engines from an axle of the engine other than the driving axle,” the valve gearing itself being either of the ordinary character or otherwise. It is also proposed to place the driving axle of the engine under the fire-box, and to construct the frames of engines, tenders, waggons, and carriages “each of two or more bars or plates of metal, placed a little distance apart, and secured in that position by the ‘horn plates’ and the other attachments. It is further proposed so to construct locomotive engines and tenders, and to combine the same together in such a manner that the engine shall carry the fuel and the tender the water, or ‘vice versá,’ or either of them shall carry only a portion of the water or fuel, or both, and the other the remainder.” And in using locomotive engines of the kind known as “tank engines” it is proposed to unite or combine together two such engines, so that both shall be under the control of one driver, and shall in fact be worked as one engine.

An illustration of that part of the invention which relates to the construction of the frames of engines and vehicles is given in which such frames are composed of two bars of iron, placed some distance apart, and held in position by means of angle irons at each end, and by the horn and motion plates. The coupling of two tank locomotive engines together is mentioned more especially with reference to “working inclines and sharp curves,” the engines being placed together back to back and united by a coupling bar, or by coupling bars, such bar or bars being very strong, “and with a long bearing, or two or more shorter bearings in each engine, so as to give such an amount of vertical rigidity that one engine may bear the other up in case of the fracture of an axle, or other accident, but without preventing their swivelling with each other laterally.” A pipe furnished with a valve connects the two boilers together above the water lines, and there may be a similar connection below the water lines.

[Printed, 1s. 2d. Drawings.]

A.D. 1864, February 8.—N° 328.

McHAFFIE, NEIL.—“Improvements in the manufacture of  
“ cast wheels.”

This invention relates to the manufacture of wheels made of cast hematite iron, and consists “in casting the ring and the  
“ spokes or radial arms of a wheel in one piece or casting, the  
“ inner ends of the spokes or radial arms being by preference  
“ left entirely separate and unconnected,” and the casting having been annealed, a boss or nave of any suitable metal being cast upon such inner ends. The latter may however, if desired, be connected together by a thin web, or they may have dovetails on their ends which will become embedded in the metal of the boss. The patentee states that for railway wheels and some other purposes, he prefers to make the arms or spokes of a curved form, and then the contraction of the metal in cooling will slightly straighten the arms, and so prevent any great strain upon the other parts of the wheel. When the nave is to be composed of metal that requires annealing, both that and the rest of the wheel may be annealed at one operation, the inner ends of the spokes being cast in this case of tapering form, so that they may in contracting shrink slightly away from them, the ends of the spokes being coated with black lead or other material to prevent the metal of the boss from uniting with them, and being afterwards elongated by hammering. Or in place of this, dovetail grooves may be formed around the periphery of the boss, these grooves being between the ends of the spokes, and the latter being secured in their places by pieces of heated wrought iron or steel being hammered into such grooves.

[Printed, 4d. No Drawings.]

A.D. 1864, February 17.—N° 404.

TESTUZ, FRANÇOIS.—“An improved brake, applicable to loco-  
“ motives, railway, and other vehicles.”

This invention consists “in the construction of certain me-  
“ chanism by means of which two blocks of wood or other  
“ suitable material are brought to bear from opposite directions  
“ upon each periphery of the two wheels upon the same axle of a  
“ railway or other carriage simultaneously. The blocks of wood  
“ are fixed upon transverse bars reaching from one wheel to the



of which is suspended by a wheel. On each of the shafts lever, this again being connected with a nut which is placed on the screw which extends below the carriage. The screw block is moved so as to separate them from the wheels at pleasure. The carriage is connected to that of another carriage of which are capable of sliding on rails so arranged as to prevent the shock when two carriages are brought together.

According to another arrangement, the screw parts thereon is provided with blocks which are connected directly through the blocks, the screw parts for each carriage being cut in opposite directions, so that the blocks are moved either towards or from the wheels at the requisite. This arrangement, however, is applicable to the wheels of one side only.

The invention is applicable to all kinds of vehicles, but also to carriages for

[Printed, 1s. Drawings.]

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(Provisional protection only.)

being moved in one direction, moves a link connected to it, and through that a lever mounted upon a transverse rocking shaft, arms upon the latter and links connected therewith then forcing break blocks against the wheels of the tender. Below the carriage next the tender is also a longitudinal shaft and similar break apparatus, the two shafts being connected "by a double forked gear, fixed on a circular disc," and similar arrangements are connected to each other carriage of the train, the result being that all the breaks of the train may be operated upon simultaneously by the driver, the handle on the vertical shaft being turned in one direction pressing the breaks against the wheels, while on being turned in the other direction it releases them therefrom. In order to prevent injury to the longitudinal shafts from shocks given to the buffers, each shaft is made in two pieces, the end of one, which is of square section, sliding in a socket of corresponding form on the end of the other.

[Printed, 6d. Drawing.]

A.D. 1864, March 1.—N° 512.

WOODWARD, JOHN.—(*Provisional protection only.*)—"Improvements in buffers."

The object of this invention "is to prevent the rebound of buffers when subjected to any extraordinary shock or pressure, yet to allow them to play to and fro when they are only acted upon by the ordinary pressure;" and the invention consists in forming in or on the buffer rod a rack, and adapting a pawl or catch to the frame through which the rod works, the arrangement being such that the ordinary amount of play is allowed to the buffer for general purposes, while on the rod being drawn further in than usual, in consequence of a collision or otherwise, the pawl engages with the rack and prevents the buffer from rebounding. The pawl is provided with a "tail," by means of which it can be set free from the rack when necessary.

[Printed, 1d. No Drawings.]

A.D. 1864, March 8.—N° 569.

PRICE, JAMES, and DONOVAN, RICHARD EDWARD.—"Improvements in the means and apparatus for preventing collisions on railways, and for lessening the effects of the same."

One part of this invention relates to preventing or lessening the concussion arising from a locomotive engine or train running

against the blocked end of a terminus or blind siding, and consists in the employment of either a sliding or rolling frame, or of buffer rods at the end of the terminus or siding, such frame or buffer rods, on an engine coming into contact with the same, being caused to draw or push bars, rods, or plates of iron or other suitable material through one or more fixed dies, or against cutters, so arranged as to draw out, compress, cut, shear, or plane such bars, rods, or plates along one or more of their edges or surfaces. Or the dies or cutters are attached to the moving frame or buffer rods, so as to act upon fixed bars, rods, or plates, or upon the rails themselves.

Another part of the invention consists in attaching a die or dies, or cutters, to a train, such die or dies, or cutters, being so arranged as to be capable of being made to act upon a bar, rod, or plate, or upon bars, rods, or plates also carried by the train, and capable of being suddenly attached to the rails, chairs, sleepers, or other fixed points on the permanent way, whereby such plates, rods, or bars are dragged through the dies or against the cutters, the momentum of the train in the case of apprehended collision being consequently expended in the drawing out, compressing, cutting, shearing, or planing of such bars, rods, or plates, and the train thereby stopped before a collision can take place. Or the dies or cutters may be made to act upon the rails or sleepers of the permanent way. Or in order to lessen the concussion when a collision does take place the dies or cutters may be connected with the buffer rods of the engine or of the carriages or trucks of a train, in such manner that on such buffers coming into contact with an obstacle which might cause a violent collision the dies or cutters are made by the forcing inwards of the buffer rods to cut, compress, draw out, shear, or plane the edge or edges of a desirable number of bars, rods, or plates, or of the rails or sleepers, thereby expending the force of the concussion.

The invention is set forth at some length, and under various modifications.

[Printed, 1s. Drawing.]

A.D. 1864, March 8.—N<sup>o</sup> 572.

MOIR, WILLIAM, and SERJEANT, CHARLES ELDON.—“Improvements in railways and railway carriages.”

The main feature of this invention consists in “combining  
“ with ordinary permanent ways of railways on which locomotive  
“ engines run, side rails with wheels at intervals to support  
“ trains of carriages,” such carriages “being constructed suit-  
“ ably for moving thereon.”

The carriages are constructed with grooves or channels in the lower parts of the framework on each side, and into these grooves or channels the wheels of the outer or side rails enter, friction rollers being also arranged below the carriages which serve to guide and steady them, more especially when passing round curves. The locomotive engine or other propelling power is provided with wheels, and works upon the inner ordinary rails in the usual manner, but the carriages have neither bearing wheels, axles, nor springs, there being, however, on each side of each carriage a safety flange or guard, which covers the wheels of the side rails without touching the latter. The framework of the carriages is composed by preference of T and angle iron, while the bodies are composed of corrugated iron, the framework of the seats being of T and angle iron braced over by steel or iron bands, upon which the stuffed seats rest. The couplings of the carriages include in their construction buffer springs, which render buffers of the ordinary kind unnecessary, such springs acting also as draw springs, the draw rods being coupled together by a hook of peculiar form on one end of each entering a link or loop in the next, and no coupling chains being used. A break van is described, from which, by means of a hand wheel and certain racks and gearing, breaks may be pressed against the outsides of the external rails, this part of the apparatus being extended to several carriages of the train when necessary. In arranging the inner and outer rails the former may, if desirable, be placed below the level of the ground.

The invention is illustrated by a number of elaborate Drawings, which it will be necessary to inspect in order clearly to understand the details thereof.

[Printed, 5s. Drawings.]

A.D. 1864, March 8.—N<sup>o</sup> 577.

GREAVES, HUGH.—(*Provisional protection only.*)—“Improve-  
“ ments in constructing and unloading wagons used on railways

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" and tramways, parts of which improvements are applicable also  
 " to other like purposes."

This invention relates principally to the construction of wagons used on railways and tramways for the conveyance of coals and similar articles, and consists in bringing the body of the wagon to the under carriage at each side, so that by withdrawing the pins of the hinges at one side of the body, that side may be raised, when the bottom being thrown into an inclined position the contents of the wagon will be shot out at the opposite side, the sides of the wagon itself being hinged as usual. The lifting of one side of the body of the wagon is effected by the use of overhead or travelling cranes placed along the line, or by means of "suitable lifting or raising apparatus, carried with or capable of being attached to the wagons."

[Printed, 4d. No Drawings.]

A.D. 1864, March 15.—N<sup>o</sup> 652.

CHAMBERLAYNE, THOMAS. — "Improvements in the construction and mode of connecting and working railway carriages, trucks, and wagons."

According to this invention, instead of the usual form of buffer head or similar form of projection upon the outer end of each buffer bar at each end of each railway carriage or truck, and instead also of trusting solely to the links or screw couplings, and the hooks of the draw bars for keeping the carriages of a railway train together in line, the patentee so arranges the buffing parts of a railway carriage or truck "as whilst the necessary amount of elasticity or yielding action is obtained, a means of supporting the end of one carriage is also provided, so that in case of a wheel or one or more pairs of wheels, or one or more of the axles breaking, such carriage or truck would be supported, and the passengers and goods remain uninjured."

In order to effect this the patentee makes at each end of the carriage or truck "one male and one female projecting piece or continuation of the buffing bar, the two male projections being at the diagonal corners, and the two female projections at the other diagonal corners of each carriage or truck, so that when any carriage similarly fitted up is brought up to it for the purpose of being coupled to form part of a train, the male projection of one carriage fits into the female projection of the next

“ carriage, irrespective of which end of the carriage is presented for the purpose, and both the male and female projections being compressible, or sliding in and out under increased pressure, the requisite amount of buffing or ability of receiving concussion is afforded, whilst the extent to which the male projection enters into the female portion of the apparatus enables any carriage which may break down to be supported between the preceding and following carriage of the train, the male and female projections being formed of sufficient strength for that purpose. The spring may either be a spiral spring placed before or behind the end frame piece of the carriage, and be directly acted upon, or may be elliptic, flat, or any other form, placed in any convenient position within the under carriage or frame, and be operated upon by means of a rod.”

The buffer rods of the buffing apparatus may be solid instead of being hollow, “and serve as tubes through which may be led signal wires or rods, or other means of communicating between the guard or guards and engine driver, or the passengers and engine driver, or the passengers and guards.”

In order to enable carriages provided with buffing apparatus made according to this invention to be coupled and run with carriages made in the ordinary manner, the patentee provides plugs suitable for fitting into the projections or blocks of the buffer board or end frame of the carriage, such plugs being in some cases bored through their axes, and furnished with short spindles or rods carrying buffer heads at their outer ends, the inner ends being so formed as to act upon the spring or interior parts of the buffing apparatus. Or he substitutes for the male pins or pistons “those having at their outer extremity a projection or buffing piece of a size to correspond with that of the buffing pieces of the carriages having the ordinary buffing arrangement.”

[Printed, 8d. Drawing.]

A.D. 1864, March 16.—N<sup>o</sup> 678.

HOWARTH, RICHARD.—“Improvements in apparatus for covering railway trucks and other carriages.”

According to this invention “a roller is used, and the canvas or other flexible cover is wound on and unwound from such roller in a somewhat similar manner to a roller blind, but in



" this arrangement the canvas or cover is wound double on the roller." Spring rollers may be employed, but they are not essential, as the rollers may be caused to rotate so as to wind up the cover by a crank handle, or by gearing. " The necks or axes " at the ends of a roller are mounted on the upper ends of two " radius rods," applied one at each end of a railway truck or other carriage, such rods turning on axes at their lower ends, " and " the axes are capable of being raised or lowered to accommodate the apparatus for a higher or lower loading of the truck or carriage." When such a truck or carriage is about to be loaded, the roller with the flexible cover wound thereon is at one side of the carriage or truck, and consequently out of the way, but when such truck or carriage has been loaded, " the simple act " of drawing on one end of the cover will cause that part of the " cover to be unwound, which at the same time will unwind a " like quantity of the other part of the cover, and raise the roller " so that it will come directly over the load, whilst the two parts " of the cover will come on either side of the load. Or the roller " may be first raised to a position over the load in the truck or " carriage, and then by pulling on the one end of the cover it " will cause both parts to be simultaneously unwound."

Different modifications of the invention are described.

[Printed, 10d. Drawing.]

A.D. 1864, March 16.—N<sup>o</sup> 680.

VON KANIG, WILHELM ADOLF.—"Improvements in railway " telegraphs and signals, and also in the permanent way and " carriages for preventing railway accidents."

One part of this invention consists in a mode of preventing a railway train from leaving the rails, the essential feature of which is the addition to each carriage of a pair of " guide wheels," these being similar to the other wheels of the carriage, but having their flanges outside instead of inside the rails. This arrangement may be varied in the case of carriages with six wheels by furnishing the central pair with double flanges, or converting that pair into guide wheels by placing the flanges thereof outside instead of inside the rails.

Another part of this invention relates to removing obstacles from the rails, which is effected by means of a sander placed in front of the engine or guard's van. For removing obstacles

which may be directly upon or between the rails, a bar or plate bent into the form of a triangle is mounted in front of the engine or van, being placed upon a vertical shaft so as to turn thereon or therewith, or to slide sideways in either direction, so as to bring the apex of the bar or plate over the right or the left hand rail as may be required. The bar or plate will then extend across the rails in an inclined position, the inclination being regulated by a lever or chain and pulleys, and such bar or plate will, on coming into contact with any solid matter which may be upon or between the rails, slide or throw it aside, "clear of the train and rails." For removing cattle (for example) with as little injury thereto as possible, certain upright standards are so arranged as to carry a net or other flexible covering, the whole being so contrived as to turn or slide in such manner upon coming into contact with the animal as to remove it from the line, "the yielding substance and " inclined side of this part of the fender lessening the injurious " effect of the operation."

The other parts of the invention do not require notice here.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, March 18.—N° 693.

DANCART, FERDINAND.—"Improvements in brakes for railway " carriages."

This invention consists of an improved brake more especially adapted to railway carriages, and "by the employment of which a train " may be stopped more rapidly and with greater security " than by the brakes at present used." The patentee causes the bottom of the carriage to which the brake is to be adapted "to be " fitted on each side with a strong beam, to each of which three " slides of metal forming the brake are so adapted as to be im- " mediately above the rails;" these slides are furnished with flanges similar to those of the wheels. "The wheels of the car- " riages, as well as the springs and grease boxes, are borne on " two moveable frames, the ends of which frames nearest the " ends of the carriage are secured by screw bolts acting as hinges; " the other ends of the frames meet midway beneath the carriage " and fit freely one with the other; they are held in their position " by an adjusting screw shaft which is operated by means of a " hand wheel set in motion from above. On withdrawing this " screw the two frames rise, and so draw up the wheels from the

" rails, thus when the carriage is to be brought to a stop, the  
 " adjusting screw shaft is sufficiently withdrawn to permit of  
 " the wheels rising from the rails on which the metal slides  
 " gradually rest, and so form a powerful brake."

Instead of a screw shaft for withdrawing or applying the  
 wheels, "many other arrangements, such as a system of levers,  
 " could be employed with equal effect." And the wheels "may be  
 " raised entirely free of the rails, or they can be withdrawn less,  
 " so that both they and the metal slides rest on the rails;" the  
 brakes at each end of the carriage being "capable of sufficient  
 " movement to permit of them adapting themselves to the junc-  
 " tions and curves of the line."

[Printed, 6d. Drawing.]

A.D. 1864, March 23.—N<sup>o</sup> 733.

WINBY, WILLIAM EDWARD, and WHARTON, WILLIAM.—  
 (*Letters Patent void for want of Final Specification.*)—"Improve-  
 " ments in the manufacture or construction of springs for rail-  
 " way and other vehicles."

The object of this invention is to permit the several plates  
 forming the spring "to be brought together and play freely in a  
 " longitudinal direction while preventing lateral motion, and that  
 " without weakening the plates by slots cut through them as in  
 " ordinary springs, consequently dispensing with the use of pins  
 " or studs working in the slots. The invention is illustrated by a  
 Drawing containing a large number of Figures, in some cases the  
 plates of which the spring is composed being so rolled or shaped  
 as to "tie or bed in each other when superposed," without the  
 aid of any intermediate key or fastening, and in other cases round  
 or square key pieces being placed in longitudinal grooves made in  
 the plates, the latter being in all cases secured in position by the  
 ordinary bands.

[Printed, 8d. Drawing.]

A.D. 1864, March 24.—N<sup>o</sup> 753.

TORREY, WILLIAM AUGUSTUS.—(*A communication from Joseph  
 Wood.*)—"Improvements in lubricating the axles of railway  
 " carriages."

Before describing the details of this invention the patentee  
 mentions that heretofore in some cases the axles of railway car-

riages have been lubricated by making the lower box a receptacle, which has been filled with cotton waste saturated with oil, such waste keeping the axle constantly oiled by means of capillary attraction. He adds, however, that such an arrangement is highly disadvantageous, because the cotton after a time becomes charred and unfit for further use. And he then states that according to this invention he employs wood shavings, by preference those of pine or "sea grass" (*ruppia*), in place of cotton waste. The shavings he employs are such as are made by carpenters, and when sea grass is employed it is only necessary that it should be previously dried, the lower box being made larger than when cotton is used, and at starting as much oil is poured into it as it will hold, in addition to the shavings or sea grass, the patentee stating that "the box of a railway axle when thus arranged and lubricated will frequently run for months without requiring any attention."

[Printed, 10d. Drawing.]

A.D. 1864, March 31.—N° 806.

HOLBROOK, WILLIAM.—"Improvements in window sashes."

This invention consists in certain improvements in the construction of window sashes, applicable, among other purposes, to railway carriages, omnibuses, and other situations, the objects of the invention being "to enable the window to be easily raised or lowered and maintained in any desired position; to be proof against wet or the draught of air, and to be noiseless, either from the action of wind, or the motion of a railway carriage or other vehicle."

The sash frame is constructed in the ordinary manner, with an inside beading, a cavity being formed in the sash frame for the admission of a "biting roller" attached to a face plate, certain horizontal pins, guides, and springs, and a piece of india-rubber being used to render the opening and closing of the window more easy.

[Printed, 8d. Drawing.]

A.D. 1864, April 1.—N° 807.

STOTT, ELIJAH.—"Improvements in the manufacture of rails for railways, which improvements may also be applied to the manufacture of bars for the tyres of railway wheels, and to

" other purposes to which the said bars are or may be applicable." " ble."

This invention relates in the first place to " making steel faced " rails for railways," being also applicable to the manufacture of steel faced bars for the tyres of railway wheels, and for various other purposes. Such rails and bars are formed from piles of which the top or bottom, or top and bottom are composed of compound bars of slabs of iron and steel, " the edges of the slab " or bar of steel of the said compound bar or slab being covered " and protected " " so as thereby to preserve the said edges of " the steel bar or slab from the injurious action of the fire during " the heating of the pile, and ensure a sound welding of the said " steel to the iron."

The compound bars or slabs of iron and steel are formed by grooving bars or slabs of wrought or puddled iron, and inserting into such grooves bars or slabs of steel; or a plain bar or slab of wrought or malleable iron may be placed on each side of a bar of steel, in either case the edges of the bar of steel being preserved by the iron from any injury by the fire during the heating process. The welding is effected by the use of rolls of suitable form; and the invention may be applied to the working up of old rails, as well as to the treatment of other slabs and bars.

[Printed, 8d. Drawings.]

A.D. 1864, April 2.—N° 825.

LINDNER, EDWARD.—" Improvements in springs applicable for " railway carriages, buffers, and other similar purposes."

This invention " mainly consists in surrounding metal springs " by a liquid enclosed in a box or chamber in which the springs " act. As the liquid always exercises an equal pressure upon the " spring, and as every part of the spring is surrounded by the " liquid, all vibration of the spring is obviated." The patentee introduces into the liquid a bag or case, or bags or cases, of india-rubber or other suitable material, filled with air, and a piston is employed in combination therewith, the arrangement being such that " the air by being compressed greatly increases the spring " power of the apparatus."

The patentee states that the liquid which he prefers to employ is " molasses with dissolved glue," which both preserves the india-rubber and is not liable to freeze.

Different modifications of the invention are described, the invention being applicable not only to the buffer and other springs of railway engines and carriages, but for "the reception of the recoil of cannon, and for other similar purposes."

From a passage at the end of the Specification it appears that the patentee claims the use of liquid enclosed in a box or chamber along with an air bag or case, or air bags or cases. "with or without a metal spring acting in said box or chamber."

[Printed, 8d. Drawing.]

A.D. 1864, April 2.—N° 832.

TISDALE, CHARLES DARWIN.—"Improvements in railways and the carriages thereof."

The main object of this invention is to enable a railway carriage to be run on either of two railway tracks of different gauges or widths, and to be changed from one to the other as occasion may require. The invention embraces a multitude of particulars, of which an outline only can be given here; and consists, firstly, in certain "wheel-changing rails and locking mechanism, or their equivalents, in combination with two tracks of different or unequal gauges, and with the wheels so applied to the axles of the carriage or to the carriage as to enable those on one side of the carriage to be moved either toward or away from those on the other side of the carriage." This is effected by having the wheels mounted loosely upon the axles, but compelled to rotate therewith by means of a "feather connection," being capable of sliding to and fro thereon, however, and being connected to sleeves or tubes in which are grooves, projections from certain "yokes" taking into these grooves, and such yokes being combined with a rope passing round a sheave, and likewise round the barrel of a "hand windlass," the result of the whole arrangement being that the wheels of each axle may be brought nearer together or placed further apart, certain "deflecting or change rails" being employed in effecting the change from rails of one gauge to those of another, the yokes also serving to lock the wheels in any given position.

Secondly, the invention consists in the combination of a switch and an extra broad gauge track rail with the "change rails" mentioned above, and the two tracks of different or unequal gauges.



Thirdly, in certain "peculiar wheel-locking mechanism" in which bolts are passed through holes in certain bars connected with the mechanism by which the distance between the wheels is varied, this mode of locking the wheels being apparently meant to apply to an arrangement which is described, in which each wheel is mounted upon a separate axle, certain latch bars and pins also aiding in this part of the invention.

Fourthly, in the use of a truck frame "composed of two movable frames and a king bolt bar (by which they are connected), or its equivalent, the same being arranged and applied together" in such manner that the two movable frames run side by side, the king bolt bar passing through both frames, from side to side, the frames being capable of sliding to and fro thereon, and thus becoming adapted to rails of different gauge, each frame being mounted upon wheels placed upon separate short axles, and the king bolt itself passing through the central part of the king bolt bar. The ends of the two frames are connected by means of latch bars and pins capable of adjustment to different distances between the frames, and the latter are connected to the king bolt bar by bolts passing through both, the bar having shoulders at the ends in order to prevent the frames from moving too far asunder, and the carriage body, which is placed upon the truck frame, and which swivels upon the king bolt or pin, resting upon antifriction rollers. Instead of a king bolt bar, a sort of frame or platform may be used.

Another part of the invention consists in a certain arrangement of "two wheels, a sleeve, an axle, and stuffing boxes, whereby one wheel can be rotated independently of the other." One of the wheels is connected to a long sleeve or tube which is placed upon a solid axle, and extends to the interior of the inner boss of the other wheel, which runs loosely upon the axle, the inner boss turning loosely upon the end of the tube, and the object of the stuffing boxes being to prevent the escape of the oil used for lubricating the axle, which is introduced through an opening in the tube or sleeve, a collar near one end of the axle aiding in producing this effect.

The invention further includes "a combination consisting of two tracks of different or unequal gauges, a longitudinal ascending rail, and a lateral descending wheel plane" for the purpose of changing railway carriages from one track to another of different gauge. And also arrangements for effecting the same

purpose, one of which consists of an auxiliary track rail, two tracks of different gauges, a longitudinal ascending rail, and a lateral descending wheel plane; the other consisting of a flange guard rail, two tracks of different gauges, a longitudinal ascending rail, and a lateral descending plane.

[Printed, 1s. 10d. Drawings.]

A.D. 1864, April 12.—N° 911.

PIÉMONT, FREDERIC GUILLAUME. — (*Provisional protection only.*)—"Improvements in oil boxes used for oiling the axletrees of railway carriages."

The inventor in this case proposes to lubricate the journals or axletrees of railway rolling stock "by means of oil boxes enclosing a cylinder bathing in the oil, and supported at its centre by two pins or pivots submerged in the oil." Each pin works in a bearing having in the interior a spiral spring, the cylinder being thus constantly pressed against the journal or axle, and receiving rotary motion therefrom, conveying thereto a continual supply of oil. "The level of the oil being below any issue, whether the vehicle be stationary or in motion it cannot escape."

[Printed, 4d. No Drawings.]

A.D. 1864, April 12.—N° 913.

CHAMBERLAYNE, THOMAS.—"Improvements in safety hooks and couplings for connecting railway engines and carriages, and for other similar purposes."

The object of this invention is to enable the engine, tender, and carriages of a train to become detached from each other in case such engine, tender, or carriages, or any of the latter, should leave the rails. For this purpose the patentee substitutes for the ordinary form of hook used for connecting the side chains and screw couplings, a hook of L-shape, either single or double, having a hinged or moveable piece or point adapted thereto, which may either be held in its normal position by a hinged spring, clip piece or stop, entering a hole or recess in the moveable point, or by the latter being so formed as to complete the third side of a staple-like hook, and be held in its place by a spring. The hook is so connected to the engine or carriage that the bent portion upon which the coupling link is placed is in a horizontal posi-

tion, the hinged portion not being acted upon so long as the draught of the coupling link is in a straight line, but the arrangement being such that on a divergence from such line of draught the coupling link slides along that part of the hook on which it works, and, pressing the hinged piece or point aside, ultimately escapes from the hook.

The invention is described under a great variety of modifications, in some cases the moveable piece being hinged to the end of the L-shaped hook, in others to a plate from which the shank of the hook projects, the arrangement in some cases giving the hook the appearance of a staple, as alluded to above. The link used is of "flat section," and corresponds with but does not entirely occupy the whole width of that part of the hook on which it works, but the patentee states that "a T-headed connecting bolt or an intermediate piece or link with a T head" may be substituted for such a link, and that "the facility of effecting disengagement by either a right or a left hand movement instead of by a movement in one of those directions only, may by these means be secured."

[Printed, 1s. Drawings.]

A.D. 1864, April 22.—N° 1018.

THOMPSON, JAMES.—"Certain improvements in the manufacture of hollow axles and axle boxes, and which said improvements are also applicable for the manufacture of locomotive and other tubes, hydraulic cylinders, and such like tubular bodies where great strength and solidity is required."

This invention consists in the articles mentioned "being produced entirely seamless, or without weld or join, whether the same be formed of iron or steel, or of iron converted into steel after their formation, or of other ductile metals, such as copper and copper alloys," the invention being in reality "an extension, for the purposes herein named, of the processes and appliances" described in the Specifications of two Patents granted to the present patentee on the 23rd of April, 1863, Nos. 1023 and 1024, and in a subsequent application for a Patent made on the 14th January, 1864, No. 108, "which said application was allowed to lapse from the inexplicitness of the Provisional Specification," and in another application made on the 19th of January in the same year, and in the Complete Speci-

fication filed in accordance therewith under the title of "Improvements in the manufacture of barrels for fire-arms and ordnance."

In "like manner as described in the Specification" of the Patent last mentioned, the patentee takes a large or small bloom or lump of iron or other metal or alloy, and after heating, swaging, hammering, rolling, pressing, or otherwise forming or converting the said bloom or lump of metal from its first shape into the desired preliminary shape, to be then left whole, or divided into smaller parts, according to the purpose for which such metal or alloy may be required. And such metal or alloy the patentee purposes to subject to the action of a suitable punching machine, in order to condense the substance of the metal or alloy "by forcing or displacing the metal from the centre into the annular part surrounding the punch or plunger," the piece of metal under operation being supported, "in a general way," by adjustable jaws or supports, which advance concentrically beneath the punch, the metal, after being so operated upon, being in a condition to be further treated by forging, rolling, drawing, or other equivalent means for imparting to it the shape desired. The patentee states that he does not consider it necessary to describe such means, as they are well understood, hollow axles, axle boxes, cylinders for presses, tubes for locomotives, cylinders for calico printing and other purposes, and other articles, being thus produced "perfectly seamless, and thereby uniform in strength."

[Printed, 4d. No Drawings.]

A.D. 1864, April 26.—N<sup>o</sup> 1046.

FOX, Sir CHARLES.—(*Partly a communication from Jared Wilson Postl.*)—"Improvements in causing adhesion of the driving wheels of locomotive engines and other carriages to or upon the rails upon which they run."

This invention "embraces a novel mode of application of electro-magnetic force or attraction, and a novel construction of apparatus to be used in such application, for the purpose of preventing the wheels from skidding on the rails, the which force or attraction, though proposed at various times for accomplishing this object, has not been hitherto effectively or successfully applied. And the said mode of application and construction of apparatus consists of or in the following im-

" improvements, namely, in the disposing arched or deflected belts  
 " of insulated wire around the lower parts of the wheels for trans-  
 " forming them into magnets, or causing magnetic adhesion to  
 " or against the rails by the passage of electricity along the de-  
 " flected belts. Also in the connecting together into a system or  
 " combination of such deflected belts around the wheels, those  
 " which are situate on one side of an engine or carriage, and into  
 " another system or combination those which are situate on the  
 " opposite side, these connections or combinations being effected  
 " by bars or armatures surrounded by coils of the insulated wire.  
 " Also in the special construction of the deflected belts by wind-  
 " ing, banking up, or building the insulated wire in a sort of  
 " cradle fashion, so that the lower members or wires of the belt  
 " being supported may hold up or within them the remaining  
 " members, the method of winding being such that the wire may  
 " follow continuously from bottom to top, and thence from top  
 " to bottom, and then from bottom to top, and so on, whereby a  
 " great saving of power is effected by having less resistance in  
 " the electric current than if the wire were laid from bottom to  
 " top, the end crossed, and then continued from bottom to top  
 " again, and so on." The invention also embraces, whether in  
 " combination with deflected belts, as set forth above, or otherwise,  
 " the construction of armatures, covered with insulated wire, and  
 " formed into a bridged shape with pendent ends or poles pre-  
 " sented very close to or against, but not touching the rails on  
 " which the engine or carriage runs."

Different modifications of the invention are described.

[Printed, 1s. Drawings.]

A.D. 1864, April 28.—N<sup>o</sup> 1072. (\* \*)

GHISLIN, THOMAS GOULSTON.—" Improvements in the treat-  
 " ment and application of seaweed." The patentee employs any  
 " of the common kinds of seaweed, and, having treated them in  
 " the manner described in the Specification, No. 2035, A.D. 1862,  
 " dries them and reduces them to an impalpable powder, or, if op-  
 " erated upon when wet, makes them into a paste. The powder or  
 " paste is incorporated with the following ingredients or some of  
 " them, and in proportions according to the articles to be manu-  
 " factured; gums, gum resins, including india-rubber, gutta percha,  
 " and substances of that class, resins natural or artificial, bitumi-

nous substances and the products of the same, paraffin and oily or fatty substances, fibrous materials, the silicates of potash and soda, pulverized chalk, talc, and other earthy matters, metallic oxides, gelatine, farina, alum, tungstic acid, powdered charcoal, and other analogous substances. He states the particular ingredients and the proportions which he prefers, according as he requires tenacity, elasticity, solidity, or durability. He mixes and incorporates the mass in a masticator provided with rollers or other mechanism, and then passes it between cylinders. He enumerates the various purposes for which this "algnite" is available; amongst them are "railway buffers." The compound may be hardened and rendered impermeable to water "by steeping it in boiled oil, or in any drying oil, or in a solution of gum or resin, or in any kind of varnish."

[Printed, 4d. No Drawings.]

A.D. 1864, April 29.—N° 1074.

CORDUKES, THOMAS, and MCGEE, JOHN GETTY.—(*A communication from John Cotton Nye.*)—(*Provisional protection only.*)—"Improvements applicable to railway wheels and axles."

The invention is meant "to reduce friction on railways, and to increase the durability of railway wheels," and the invention consists "in making the axle in two parts fitting into each other, one of which is hollow and the other is solid," each of these parts having one of the wheels fixed thereon, "so that in passing round a curve each wheel can revolve independently of the other." The two parts of the axle may be connected by a nut upon the solid taking into a screw on the hollow part, or in any other convenient manner, and the bearings of the solid in the hollow axle are lubricated by means of oil holes in the latter, or otherwise.

[Printed, 4d. No Drawings.]

A.D. 1864, May 4.—N° 1130.

JARVIS, WILLIAM.—(*Provisional protection only.*)—"Improvements in the application of brakes to carriages."

This invention relates to "the application of self-acting brakes to carriages of various kinds, the acting principle of the brakes being derived from the conversion for the time being of the traction power into a retarding power."



In applying the invention to carts or other one-horse vehicles, short lock levers are fixed to the shafts, these levers carrying eyes or rings, to which are connected ropes or chains, which pass through guides carried by the body of the vehicle, and thence to brake levers at the back of such vehicle, the brake surfaces of which are kept out of action by springs until it is desired to apply them to the wheels. At the front of the cart is a crank shaft, or its equivalent, for holding the ropes or chains at tension, or slackening them at pleasure, which may be effected by rocking the shafts by a hand lever, and the eyes or rings of the rock levers mentioned above are connected to the breeching strap, when that is used, so that the horse when pulled up will by pressing against the breeching strap rock the levers, and thus tighten the ropes or chains and bring the brakes into action. When no breeching strap is used, the rock levers must be fixed near the saddle band and connected thereto. In pair-horse carriages, where a pole is used, the levers are to be placed near the back end of such pole in such a position "as to allow the requisite amount of play for drawing the brakes into action," and an additional brake may be applied as usual by the driver in the event of the horses taking fright.

In applying the invention to railway carriages, the brakes are mounted upon "cranked rock shafts set intermediate of the wheels, and transversely of the carriage body," these shafts being connected by ropes or chains to rock levers carrying buffer heads or pads. All the carriages of a train being similarly fitted, any sudden retardation of the train will cause the foremost carriage "to press on the one next behind it, and the buffer heads of the levers coming in contact, one pair of brakes of the hind carriage will be set in action, and the like effect will be continued throughout the train."

[Printed, 4d. No Drawings.]

A.D. 1864, May 5.—N<sup>o</sup> 1141.

JEFFERSON, ISAAC, JEFFERSON, JOSEPH, JEFFERSON CORNELIUS, JEFFERSON, LAZARUS, and JEFFERSON MORDECAI.—"Improvements in railway break apparatus."

This invention relates to apparatus in which "a bar is employed for connecting the break apparatus of one carriage to the break apparatus of another carriage, the bar

" apparatus of the series of carriages thus connected being  
" actuated by the guard of the train, by means of suitable  
" gearing in the break van or carriage," and the object of the invention is to provide " a more efficient arrangement of the parts  
" which connect the ends of the longitudinal bars or axes, for the  
" purpose of affording greater facility in connecting them together,  
" and also to allow the universal joints formed near the ends of  
" the connecting bars or axes to act with perfect freedom when  
" the parts are caused to assume different angles to one another  
" at the time the carriages are passing around curves, and yet  
" admit of the free revolution of the connecting bars or axes  
" when the breaks are being brought into action."

The invention also includes arrangements of the break apparatus, whereby the whole of the break blocks (which are of the ordinary character) of a train of carriages may be brought to bear with great facility and certainty upon the whole of the wheels to which breaks are applied, the apparatus being brought into action by the guard of the train acting on suitable gearing in the break van or carriage, or by the engineer acting on similar break apparatus connected with the tender.

The invention is minutely set forth, and embraces the use of a socket, which is connected with the break bar of one carriage, the end of a bar connected with the break apparatus of the next carriage entering this socket, the bar last mentioned being provided with ribs or projections, which enter corresponding grooves in the socket, the latter having a bell-mouthed opening at the front end, and the ends of the ribs or projections being curved off or brought to a point in order to facilitate the entrance of the bar carrying them into the socket. The bar can thus slide to and fro in the socket, while the two are compelled to rotate simultaneously, and certain ball and socket joints are arranged for the purpose of allowing for the passage of the carriages round curves, these joints being provided, however, with pins or projections and recesses, which cause them to act as clutch boxes when the break bars are turned on their axes.

In combination with the break bars mentioned above, and which extend longitudinally under the carriages, are certain toothed wheels, which, when the bars are caused to rotate, act upon certain right and left hand screws, by means of which the break blocks are either pressed against the wheels of the carriages or withdrawn from them at pleasure. Or in place of the screws,

cam surfaces, levers, or other mechanism may be used, the details of the invention being capable of various modifications.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, May 12.—N° 1210.

FAIRLIE, ROBERT FRANCIS.—“Improvements in locomotive engines and boilers.”

This invention has for its object the attaining of a large amount of tractive power while avoiding an excessive pressure upon the driving wheels of the locomotive; to provide for the locomotive adapting itself readily to the turnings of sharp curves without the disadvantages usually attending the action of large locomotives under like circumstances; and to render it unnecessary to turn the engine round in changing its course, “as it is similarly arranged at both ends, and equally well adapted for travelling in one direction as in the other.”

And according to this invention, “the boiler is mounted on the centres of two frames, each frame having four or more wheels, and one, two, or more cylinders, each frame and its adjuncts forming two distinct engines, which are each complete in themselves, the steam being supplied from the boiler to both sets of engines. The boiler is thus mounted on a large number of wheels (say eight for passenger and express trains, and twelve for heavy goods engines), which are disposed in such manner as to permit of the engine running freely on the sharpest curves. These wheels are all connected together in each frame, and are driven by the engines, therefore if the locomotive be large and heavy, it will possess great tractive power, and will work with the minimum of damage to the rails and permanent way.”

After describing various details in connection with these arrangements, and stating that the frames mentioned above act on what is termed the “bogie principle,” the boiler being connected thereto by ball and socket joints, and each of these acting as a fulcrum on which the frame is capable of turning, the patentee proceeds to state that when it is desired to make a locomotive of great length, and with the bogie frames far asunder, running wheels in any requisite number may be placed under or near the fire box (which is midway of the length of the boiler) “in order to take the weight off the middle, such wheels being broad flat

"wheels without flanges." And he also describes a mode of relieving the strain upon the fulcrs of the bogie frames by the application of certain locking plates, these consisting of circular plates or segments, one attached to each bogie frame, and another to the boiler near thereto, a rib upon one fitting into a recess in the other, there being also at the corners of the frame slotted plates, in the slots of which work certain blocks. Or instead of using this arrangement, the ends of the bogie frames next the fire box may be made to assume the form of arcs of circles, and be capable of moving in a frame of angle iron attached to the boiler.

The invention is described at some length, one arrangement being mentioned in which three bogie frames are used. Buffers, drag chains, and couplings are used as found most convenient.

[Printed, 2s. Drawings.]

A.D. 1864, May 13.—N° 1221.

WEST, DANIEL.—"Improvements in fireproof railway vans, trucks, and carriages, and in fireproof cases for the reception of goods or merchandize to be conveyed by railway."

In this invention closed vans or carriages are constructed of sheet or plate iron, or other metal, and also fireproof metal cases for containing goods or merchandize, which are fitted upon trucks prepared to receive them. Upon the usual carriage frame of a railway van or truck is placed a strong flooring of planks, to be covered when needful with sheets of metal; or a flooring may be formed wholly of metal. The sides and ends of a van are composed of sheets of metal, which may be corrugated, if desirable, these sheets being riveted at their edges to vertical and transverse bars of iron, angle iron being used to connect the sides and ends together, and to the frame or floor. For convenience, the sides and ends may be composed of panels, which may be connected to the rest of the vehicle by bolts, and thus be easily removeable, and the roof is composed of curved metal plates, the edge of which overlap each of the edge of that next to it. The ends of these plates are bolted to longitudinal angle bars, and the end plates to curved angle iron ribs, this arrangement admitting of the roof being opened by the removal of sections of the plates. Cotton, hemp, or other fibre not previously packed into bales may thus be placed in the van and trampled into a compact mass, iron stays passing

from side to side of the van to sustain the pressure, and hinged doors or sliding shutters in the sides of the van may be used to remove such goods.

The metallic cases mentioned above as being used for the reception of goods may be of any convenient form and size, there being lugs at the upper ends of the cases, which project through slots cut in metal covers, bars passed through the lugs then securing the covers in their places, the covers being then fastened upon the trucks by chains and other suitable means.

[Printed. *10d.* Drawings.]

A.D. 1864, May 19.—N<sup>o</sup> 1262.

DUNLEVIE, THOMAS, and JONES, JOHN.—“Improvements  
“ in metallic alloys.”

This invention consists “in the combination and use of spelter  
“ and block tin, to which is added a small quantity of copper  
“ and a small amount of antimony.”

A mode of carrying out the invention is described in which four ounces of melted copper are mixed with sixteen ounces of melted block tin and one ounce of antimony, the mixture thus formed being then poured into a mould. One hundred and twenty-eight ounces of spelter, and ninety-six ounces of block tin are then fused together, and the compound first mentioned is then added thereto, and “the alloy is complete,” the patentees stating that the chief features of this alloy are “great durability and its low temperature when under the heating influence  
“ of friction.” Other proportions of the different ingredients are, however, mentioned, and it is stated that for lining bearings, journals, &c., “the bearing is to be tinned in the ordinary method  
“ with block tin and sal ammoniac; the improved lining alloy is  
“ then gradually fused, and the bearing heated until it will fuse  
“ a solid strip of the alloy; a heated shaft or mandril is then  
“ enclosed in the bearing and mould, and the alloy poured in  
“ between the bearing and the shaft, where it remains until it  
“ hardens; the bearing is then taken from the mould lined with  
“ the alloy.”

[Printed, *4d.* No Drawings.]

A.D. 1864, May 27.—N<sup>o</sup> 1311.

BOUTET, CHARLES.—“A new automaton break for the prevention of railway accidents.”

According to this invention break apparatus is employed, which is composed of "a clutch box or toothed collar," in two sections, "one of which is fixed to the axle of one pair of wheels, and "turns with it. The other is moveable; the collar or clutch is "placed on the axle, which revolves freely within it," and to this last section is attached a strong flat chain, prolonged by an iron bar, the extremity of which is fixed in a cross bar made of wood or any other suitable material. This bar is suspended by hooks or hinges attached to the side of the framing of the carriage. To this cross bar are fixed two ordinary break blocks, "placed so "as to act on two of the wheels. When the train is in motion "the break blocks are kept in their position away from the wheels "by their own weight, and by the spring of the preceding carriage." To the middle of the cross bar mentioned above is fixed a short chain, which, through the medium of an angular lever, acts upon a flat spring, and the latter upon the clutch box of the preceding carriage by means of a fork. "This carriage "communicates in its turn, and by the same means, the action to "those which precede it, and so on to the head of the train." The apparatus "is so constructed that in case of the breaking of "the coupling irons and safety chains, there would be no separation of the parts of the train without breaking the connecting "chain attached to the break, which latter chain, in breaking, "throws the break of the detached carriage into gear." Five or six break apparatus, such as above described, will be sufficient to stop a train of 15 or 16 carriages.

"The combined apparatus may be also applied to ordinary "carriages."

[Printed, 8d. Drawing.]

A.D. 1864, May 27.—N° 1316.

WHITLEY, JOSEPH, and BOWER, DAVID FARRAR.—"Improvements in the manufacture of wheel tyres."

This invention consists "in forming wheel tyres by the aid of "centrifugal force." The patentees "take a mould and cause "it to revolve," and, while revolving, they force or cause to flow into it cast steel or other metal. In making cast-steel tyres, they pour the cast steel into the mould while revolving, and the steel forms itself into a rim or tyre of the form indicated by the mould. In making malleable iron tyres, that is to say, wrought-iron tyres,



they take the ball or bloom from the furnace, and force the same while in a molten or plastic state into the revolving mould, the metal thus assuming the form indicated by the mould. "The rims or tyres produced, as before described, if not of the finished or desired size, may be re-heated, and then hammered, rolled, or pressed out to the proper size."

The mould may be made to revolve either horizontally or vertically.

[Printed, 8d. Drawing.]

A.D. 1864, May 31.—N<sup>o</sup> 1347.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from Jean Lannur.*)—"A new method of and apparatus for reducing the circumference of metal hoops, rings, and tyres."

The apparatus employed for the purpose of this invention consists "of movable hoops forming a frame, into which the ring or other circle, the diameter of which is to be reduced, is placed," such ring or circle then being "shrunk, after having been brought to red or white heat, by compression." An arrangement is described in which a hoop is used for the purpose of compression, the two ends of this hoop not, however, being united, but one of them being connected to a rack, in gear with which is a pinion mounted upon a shaft carrying a wheel, which, again, is operated upon by another pinion, fixed upon a shaft turned by a handle, the result of this being that the hoop is contracted in size, and consequently the heated ring within it. The hoop is so arranged that by means of certain bolts which may be placed in different holes, its size may be adapted to the reception of different sizes of rings; "but for extra sizes, change pieces may be substituted," and other variations in the details of the apparatus made. As described above, the invention relates only to compressing and so reducing the size of complete rings, but similar apparatus may be employed to unite the two ends of a strip of metal meant to form a ring, the ends being heated, and "compressed or squeezed together."

[Printed, 10d. Drawings.]

A.D. 1864, June 2.—N<sup>o</sup> 1373.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from Jean François Auguste Aerts.*)—"Improvements in lubricating axles and other moving parts of machinery."

This invention consists in improvements upon the invention for which Letters Patent were granted to Augustus Aerts on the 12th of March, 1861, N° 608, according to the Specification of which Patent there was fixed at the back of the journal a collar upon the axle to prevent the escape of water, the lubricating agent employed, on the side of the nave of the wheel. Around this collar a leather washer was fixed by small screws in the back plate, a circular spring causing adhesion of the washer to the collar. This arrangement is defective, inasmuch as in course of time the leather becomes worn and allows water to escape from the box.

According to the present invention, which is described chiefly with reference to railway carriages, the journal of the axle enters the body of the box, which contains at its lower part a reservoir for water or other lubricating matter, and at the outer end of the journal is fixed a flanged disc, secured by means of a key or catch, and a central bolt furnished with a circular metal plate, the latter being "slightly bulged so as to act as a spring," and serving to "destroy the vibrations produced by rotation," the plate, moreover, having under it a washer of india-rubber or other elastic material. On the rotation of this disc with the axle, lubricating matter is carried up by the disc to the upper part of the box, such matter being removed from the disc by a packing or block and led directly over the journal. The axle box is divided into two compartments by a plate or partition, held by a spring or screws against a projection in the box, there being holes in the lower part of this plate through which the lubricating matter passes from one compartment to the other, this plate, in fact, acting as a filter. In order to prevent the escape of lubricating matter between the partition and the front of the box, there is an arch or horse shoe piece, a similar piece preventing the escape of lubricating matter at the back of the box, a groove or grooves being also formed at the back of the journal in order to prevent the liquid from following the longitudinal direction of the axle, and suitable packings, plates, springs, and other minor appendages being introduced so as effectually to close the axle box while allowing the introduction of lubricating material when requisite.

Different modifications of the invention are described, in some cases a pad coated with some greasy substance aiding in the lubrication of the axle. And the invention also includes a mode of allowing the axle boxes, with the axles and wheels, to accommo-

date themselves to the form of the rails in passing round curves, there being under each spring a double semicircular slide or two small rollers. Also converting old grease boxes into reservoirs for water or liquid, and the adapting of the invention to the slide bars of horizontal steam engines, spinning machines, and the bearings of machinery and shafting generally. Several lubricating compounds are also mentioned, in particular one composed of oil, grease, and soap mixed with water.

[Printed, 10d. Drawings.]

A.D. 1864, June 13.—N° 1457.

GRANT, JOHN.—“Improvements in the construction of trucks “ and turntables for portable railways.”

According to one part of this invention a truck is constructed, the two ends or heads of which are fixtures, firmly secured in an upright position by suitable shores or supports, but the sides are hinged to the bottom and capable of being raised or lowered as occasion may require for the purposes of loading and unloading. Or such sides may be let down into a horizontal position, or nearly so, by means of chains or other fastenings of suitable length connected to their upper corners and also to the upper corners of the ends or heads of the truck, so as to form a wide and low vehicle adapted for carrying bulky loads, such as straw, and the harvest crops upon a farm, the truck being still further temporarily enlarged for such purposes, when requisite, by the use of broad moveable ladders, which may be attached by means of chains to the ends or heads of the truck, so as to increase the length of the latter. These trucks are meant more especially for use on portable railways, which are capable of being easily removed from one piece of ground to another, and do not require letting into the ground or “blocking up” above such ground.

According to another part of the invention a light and durable turntable for portable railways is composed of two parts or divisions, one of which revolves upon the other, the latter being fixed where requisite, and consisting of a metallic ring having a bar passing across the centre, such bar carrying a pin or socket upon or within which a corresponding pin or socket on the other part takes. The revolving part of the turntable consists of a single pair of rails, firmly braced together and connected by a cross bar, the latter being provided with a pin or socket as mentioned

above. The rails are provided near the ends with wheels or rollers, these working upon the metallic ring forming the first part of the apparatus, and the rails being thus turned into different positions with facility, the depth of the apparatus corresponding with that of the portable rails mentioned above.

[Printed, 10d. Drawing.]

A.D. 1864, June 16.—N° 1502.

CLARK, WILLIAM.—(*A communication from Alessandro Piola.*)—(*Provisional protection only.*)—"Improvements in apparatus for lessening the effects of collisions and other accidents on rail-ways."

This invention consists in "the subdivision, as it were," of the violent shock caused by two railway trains coming into collision, "into partial shocks of less force," "preserving after the collision a progressive movement which lessens by degrees the speed acquired by the two trains." This is effected by mounting in front of each engine of a train an upright cylinder, such cylinder being so arranged that on two trains meeting, the engines "would only undergo an oblique and nearly lateral shock, resulting in a decomposition of force." This would be the effect of two trains directly meeting each other, and in case of a moving train running against a train which may be standing on the line, the effect would be to drive the running train off the line.

In order still further to lessen the effects of collisions, all the carriages of a train may be provided with several lateral rows of cylinders which project outside the carriages, these cylinders tending to reduce the risk arising from a train getting off or being thrown off the line and the carriages becoming entangled with each other, while in the case of a carriage being overturned they will act as wheels. Such cylinders may be applied to passenger carriages in lieu of the usual small windows.

[Printed, 8d. Drawing.]

A.D. 1864, June 22.—N° 1560.

WHITLEY, JOSEPH.—(*Provisional protection only.*)—"Improvements in the manufacture of railway and other wheels, applicable also to the manufacture of other cylindrical bodies, plates, hoops, bars, and other articles."

The object of this invention "is to produce wheels and other articles composed of cast or malleable cast iron, steel, or other metallic substances, more perfect than is possible by existing methods," this being effected "in great measure, if not entirely, by causing the mould of the wheel or other article required to revolve at a suitable speed during the time the metal is being poured in."

The inventor mentions that in some cases he prefers "to retain the mould stationary, applying a sufficient amount of heat to it by any convenient method to take off the chill," the metal being caused to rotate by means of a revolving "runner" or "gate;" and that in cases in which it is desired to make the casting "more particularly dense," he causes both the mould and the "runner" or "gate" to revolve during the process of casting, "either in opposite directions or in the same direction, but at different speeds."

[Printed, 4d. No Drawings.]

A.D. 1864, June 23.—N<sup>o</sup> 1573.

CLARK, WILLIAM.—(*A communication from William Loughridge.*)—"Improvements in railway carriage brakes, and in the mode of applying the power thereto."

This invention consists, firstly, in the employment of "a steam cylinder provided with a piston, a steam chest provided with a valve," "connected with a lever which receives a portion of the pressure afforded by the steam within the cylinder, and a spring that weighs the necessary power required on the brakes, all being arranged with a brake actuating the mechanism in such a manner that the brakes may be subjected or graduated to any degree of pressure which may be necessary or desired, and the communication between the boiler of the locomotive automatically opened and closed so as to render the desired pressure constant, whether the same be more or less."

Secondly, "in the employment or use of an escape valve (similar in construction to the safety valve in a steam boiler) applied to the steam cylinder, and arranged in such a manner as to obviate any sudden increase of tension or pull on the brake chain, a contingency which frequently occurs when the train stretches after the application of the brakes, and also to exhaust steam from the cylinder when the brakes are to be relieved."

Thirdly, "in a novel arrangement of pulleys (the converse of the common mode of using the block and tackle), whereby a short movement of the piston is made to give the necessary length of pull to the brake chain so as to admit of a short cylinder being used, which is very desirable on account of space being limited where it is most convenient to place the cylinder."

Fourthly, "in a mode of weighting two friction plates together on a shaft or chain barrel for the purpose of regulating the pressure on the brakes to any degree the engineer or brakeman may desire, the plates, when said pressure on the brakes is obtained, being allowed to slip, and the pressure held or retained by a pawl and ratchet."

Fifthly, "in the employment or use of a ratchet and pawl, a spring and a lever, or its equivalent, in combination with a hand brake windlass, for the purpose of preventing the sliding or slipping of the wheels on the rails," and at the same time ensuring the maximum retarding effect on the carriage "in proportion to the load or weight on the same."

Sixthly, "in combining the chains and rods of the ordinary hand brake with the chains and rods of the steam brake in such a manner that the brakes may be operated both by hand and steam or other power simultaneously, or either power applied separately, as may be required, and the brakeman allowed to relieve the brakes or slacken the tension of the continuous change through which the power is applied to the brakes from the engine."

The details of the invention are minutely set forth.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, June 25.—N° 1598.

NEWTON, WILLIAM EDWARD.—(*A communication from Edouard Dincq.*)—"Improved machinery or apparatus to facilitate the loading of ships or vessels with coal, minerals, or other substances in bulk."

According to this invention waggons or trucks for railway purposes are constructed "with trap doors in their bottoms, so that by opening these doors the contents may be allowed to slide gently into a hopper," and from thence into or through an inclined trough to the hold of a vessel or other place into which it may be desired to discharge such contents. "On the



" waggons may be constructed with tail boards, and the platform " and rails on which they rest when above the hopper " (when used) " and inclined trough may be capable of being lifted up and " turned on a centre by means of a rack and pinion," so as to " tip up the waggon and cause the contents to slide down into " the hopper."

Instead of the waggons or trucks having trap doors in their bottoms, as mentioned above, they may be " made to open at " their ends."

[Printed, 8d. Drawing.]

A.D. 1864, June 30.—N° 1630.

BALANS, RAYMOND.—" An improvement in hooks for marine " and other purposes."

This invention consists " in the application to hooks for marine " and other purposes of a stop spring, by means of which the " cord, chain, or other object to be secured is prevented from " quitting its hold."

An arrangement is described in which "cheek pieces" are formed at each side of the neck or shank of the hook, below the eye, these cheek pieces serving as bearings for a square pivot to which is fixed one end of a spring, the latter making several turns around the pivot, and thence passing to the point of the hook, against the inside of which it is pressed by means of a small bar; the inside of the point of the hook being hollowed for the reception of the spring, or a hole being formed near the end of the spring into which a stud in the hook enters. The hook and spring together thus in effect form a loop, the spring being pressed down by hand, or by means of a chain or "pull piece" when it is desired to introduce the cord, chain, or other object to be secured, or to withdraw such object therefrom.

The invention is mentioned as being applicable to "railway " couplings or connexions," as well as to ships' rigging, and in general to every purpose for which holdfast hooks may be required, including saddlery and mechanical gearing or tackle.

[Printed, 8d. Drawings.]

A.D. 1864, July 1.—N° 1646.

NEWTON, ALFRED VINCENT.—(*A communication from Harri Webster.*)—"Improvements in self-adjusting couplings for rail- " way carriages."

This invention consists "in providing the heads of draw bars, " when constructed to receive self-adjusting couplings, with a " curved projection that will enable the draw bars to operate also " as bumpers, and in using in connection with such curved " projections coupling hooks or catches."

The draw bar, with the exception of the head, is made of any suitable form and material, the head of the bar on the side opposite the hook being provided with a projection, the face of which is curved in correspondence with the size of the coupling hooks, one of which is connected to the draw bar of each carriage of a train, the arrangement being such as "to have the extreme point " of the hook strike it a little outside of the centre of the curve. " By this arrangement the hook of a self-acting coupling is made " to operate as a bumper without unlocking the cars, and the " curve also assists the spring in holding the hook in place, and " prevents the cars from uncoupling when on a down grade, " when most of the automatic couplings are found to fail, especially if the track is rough and uneven." Springs are attached to the draw bars, so as to operate upon the hooks, and a chain is so arranged in connection with such hook as to enable a workman to easily disengage the coupling when requisite.

[Printed, &c. Drawing.]

A.D. 1864, July 5.—N° 1671.

WILSON, JAMES EDWARDS.—"Improvements in constructing " railway carriages and wheels."

According to this invention a railway carriage is arranged to run upon six wheels, the axles of the end wheels being susceptible of a "slight locking motion." The end axles have their springs and boxes connected to rectangular frames, placed below the bottom frame of the carriage, this frame being provided with transverse bearers, which rest upon the rectangular frames, the upper surfaces of the latter being wide enough to admit of a small locking motion of the frames. The transverse bearers and the rectangular frames are prevented from separating vertically by means of stops, and the bearers are prevented from moving in a sideway direction beyond that necessary to allow the parts to accommodate themselves to curves in the rails by other stops or clips. Each of the end frames is connected by means of two diagonal rods to a vertical pin on the under side of the body of

the carriage, placed half way between the end axle and the next or central axle, which has no locking motion applied thereto, and it is on this pair of wheels that the carriage turns as on a centre. "By these means the two end axles will have some play, and be able to lock slightly and assume positions not parallel with the central axis depending on the sharpness of the curves on the line."

A mode of constructing railway carriages is described in which "diagonal framing" is used both for the top, bottom, sides, and ends. The bottom and roof are each formed of two sets of diagonals, which may be either of metal or wood, and may be of hollow or trough iron, combined with angle iron, the trough iron having flanges on each side which are riveted together at the points at which the bars intersect each other. Upper and lower transverse bars of iron cross the diagonal bars, the former being "split at their ends and turned outwards," and riveted to the side framing, which is composed of an upper range of T-iron and a lower range of angle iron, certain zig-zag bars also connecting the transverse bars, the ends of the zig-zag bars being riveted to the T iron already mentioned. This framework is boarded in the interior, the doors of the carriages being at the ends."

In the Provisional Specification a mode of constructing wheels is described in which each wheel is composed of two dished plates, which are connected at their outer edges to an inner rib formed in the ring of a flanged tyre, there being a hole in the middle of each plate around which the metal is turned outwards to form a flange, the latter being fixed to the ends of a hollow nave, and this having end flanges to receive the end plates or covers. The axle on which the wheel turns is somewhat conical, and is furnished with collars or rings, which in combination with the covers at the ends of the nave retain the wheel securely on the axle. Inside the nave is fitted a cylindrical box, this box being conical on the inside, there being a space between this and the axle which is partly filled up by bars of soft or white metal, and there being spaces between the bars for the passage of lubricating fluid to the axle. The box "is arranged to be set up more and more as the white metal wears, and the white metal bars will be caused to come more and more nearly together." In the Final Specification this part of the invention is not alluded to.

[Printed, 1s. Drawings.]

A.D. 1864, July 8.—N<sup>o</sup> 1696.

DIXON, EDWARD JOHN.—“An improved railway brake.”

This invention relates in the first place to an improved system of stopping or checking the speed of trains upon railways, “by enabling the brake power to be placed immediately under the control of the engine driver or guard, and applied simultaneously to the wheels of such carriage throughout the entire train, whereby greater uniformity and certainly of action is obtained than by the method at present in use, and consists in forming a communication between the ordinary brake blocks placed on the outside of the wheels and the draw or traction bar secured to the bed or under framing of the carriages, so as to receive motion through the medium of screw gear direct from the engine, by which arrangement the said brakes, as aforesaid, are caused to act conjointly with each other upon the wheels, the said carriages being coupled in the ordinary manner, and admitting of the usual play between the buffer heads.”

Another part of the invention consists “in employing in connection with the above arrangement friction wheels or drums placed in the centre of the axis of the running wheels, instead of the brake blocks, as above described, the said friction drums being provided with bands or straps of soft steel or iron passing round the periphery of each of the said friction drums so as to grip or impinge firmly on the same when in motion, and thereby communicate the required brake power in like manner.”

In place of the ordinary draw bar “separate bars may be employed in like manner, as also tooth and pinion gear in connection with the ordinary rack movement in place of the above for actuating the draw bar and giving motion to the brake.” The coupling rod may also be so arranged “as to admit of being readily adjusted to the opposite end of the draw bar through the intervention of the brackets and shifting pins without necessitating the turning of the carriages when making up the train, by the arrangement of which the draw bar may be caused to actuate the brake in either direction on being forward by the engine driver.”

[Printed, 8d. Drawing.]

A.D. 1864, July 8.—N<sup>o</sup> 1703.

LEAHY, EDMUND.—(*Provisional protection only.*)—“Improvements in the construction of wheels and axles.”

The object of this invention "is to form a pair of railway wheels together with their axle in one mass, so that no fitting of the wheels on their axles will be required." To this end the inventor combines bars or rods of iron, steel, or other metal, by piling them in a peculiar way, and when raised to a welding heat, swaging them into a mass of the required form. Thus to form the periphery of a pair of wheels a number of bars of a suitable sectional area, and of a length equal (or thereabouts) to the circumference of the wheels to be manufactured, are laid parallel and in two lines or piles, the distance apart of the lines or piles being equal to the gauge required between the wheels. The spokes and axle are formed from a number of double cranked bars, equal in number to the spokes required for the wheels. The depth of the crank will be equal to the length of the wheel spokes, and the length of the bar between the cranks will go to form the axle. The cranked parts of the bars are interlaced between the bars of the piles that are to form the periphery of the wheels, such cranked parts being placed equally asunder along the length of the piles, and when thus arranged, the bars, which are to form the periphery are bent round into hoops, the cranks being thereby brought together so that they will unite at a central point and form the spokes of the wheels, the whole being then brought to a welding heat and submitted to the action of swaging dies. If desirable, additional pieces may be applied to strengthen any parts of the fabric which may seem to require it. Thus a tube or a solid shaft may be introduced between the bars as a core around which the bars are to be welded. Filling pieces may also be applied at the angles where the crank arms unite to form the spokes, and in order to give additional thickness to the periphery of the wheels the rods or bars "may be made sufficiently long to make two or more turns or laps." Instead of using "rods severed to a given length" to form the piles, "continuous lengths may be used to produce the required thickness by continuous turns."

[Printed, 4d. No Drawings.]

A.D. 1864, July 12.—N<sup>o</sup> 1731.

DAY, SAINT JOHN VINCENT.—(*A communication from Andrew Lischine and James Handyside.*)—"Improvements in wheels and axle boxes for locomotive engines, carriages, and other vehicles used on railways, tramways, and common roads."



According to this invention each wheel "consists of two  
 " central bosses of cast, wrought, or malleable iron or steel, or  
 " any other suitable material, forming the nave or central portion  
 " of the wheel, and through the middle part of these bosses is  
 " bored the hole for receiving the axle," the interior faces of the  
 two bosses being either flat or curved, and kept at such a distance  
 apart as to hold between them two thin annular plates of iron,  
 steel, or other suitable material. "The space between the plates  
 " increases gradually as the periphery of the wheel is approached,  
 " where the opening is of sufficient width to allow of the passage  
 " of the tyre between the two plates." The extremities of these  
 two plates "are rounded off so as to form an annular, curved, or  
 " other shaped ring all round the plate on its inner or outer  
 " sides, and the back portion of the tyre is made of a counter-  
 " part form, with a raised ring all round it, fitting into the  
 " annular space on the interior of the plates." The central  
 bosses and plates are bolted or rivetted together, "the result  
 " being a light and exceedingly strong wheel," a space being left  
 between the interior of the tyre and that portion of the two plates  
 where their inner surfaces meet, which space it is preferred to fill  
 up with either wood or sawdust, "or other material that may be  
 " an imperfect conductor of sound," this effecting a great  
 reduction in the noise usually made by wheels of this class.

According to the Provisional Specification another part of the  
 invention consists in constructing the axle boxes of locomotive  
 engines, carriages, and other vehicles "in such manner that a  
 " constant circulation of water or other cooling liquid is main-  
 " tained in their interior;" but in the Final Specification no  
 allusion is made to any such arrangement.

[Printed, 8d. Drawing.]

A.D. 1864, July 13.—N<sup>o</sup> 1752.

CLAXTON, CHRISTOPHER.—"Improvements in railway car-  
 " riages."

The object of this invention is to render the security of railway  
 passengers against personal assaults and insults more perfect;  
 evidence against the offenders being at the same time more easily  
 attained. The invention consists in forming openings in the  
 partitions which separate one compartment from another, and  
 filling such openings with wire gauze. Each opening is of suffi-  
 cient size to admit sound to pass with such facility as to allow



any loud noise made in one compartment to be heard in the next, and so that when the gauze is forcibly removed a person may see from one compartment to another, but it is not so large as to permit of a person passing through it. The gauze is sufficiently fine to prevent its being seen through, and to prevent ordinary conversation being heard through it; "it may be used double if required," and is mounted in a frame furnished with hinges and a handle and catch, the frame being thus easily moveable.

[Printed, 6d. Drawing.]

A.D. 1864, July 14.—N° 1754.

**TUCKER, JOHN SCOTT.**—"Improvements in the construction of railway carriages."

The object of this invention is to "enable communication to be established between the different carriages and compartments of the carriages" of railway trains, in order that should any disturbance or irregularity occur in one carriage or compartment of a train, the occupants of that carriage or compartment might be observed by those of the next. The invention consists in fixing in the bulkheads or partitions of the carriages glazed "check lights" or panels, which may either be capable of being opened or otherwise, but are placed at an elevation above that of the eyes of seated passengers, so as not to interfere with the ordinary general privacy of travellers; reflectors being also employed if desirable "to assist the view," and apertures being also formed at the ends of the carriages, through which the occupants of different carriages may communicate together, such apertures being provided with falling or folding doors, flaps, or slides, which may if preferred be composed partly of glass.

The patentee also proposes to place in each carriage bells, whistles, strikers, or alarums, connecting by cords, wires, rods, pipes, or chains those of one carriage with those of another for the purpose of assisting passengers in communicating with each other, or if necessary with the guard and engine driver. The details of the invention may be variously modified.

[Printed, 1s. 6d. Drawing.]

A.D. 1864, July 18.—N° 1796.

**WILSON, THOMAS.**—(*Provisional protection only.*)—"Improvements in signalling on railway trains, and in securing the doors and windows of railway carriages."

In this invention a rod is placed on each side of each railway carriage, at such a height as to allow of the carriage doors opening below them when requisite, but so connected to bars or cranks turning in joints as to be capable of being lowered so as to cross each door at about the middle of the upper or window half of each door, thus both preventing the door from being opened or the passage of any person through the upper or window part thereof. Suitable fastenings are provided for holding the bars in a raised position, and also others for retaining them in position when lowered, and the former may be liberated by handles or levers arranged for the purpose inside the carriage; the bars then falling and becoming secured by the other fastenings. The falling of the bars will act as a signal, indicating (for example) that there is some person in the carriage whom it may be desirable to secure. Instead of causing the bars to descend so far as the middle of the window they may descend only so far as to prevent the opening of the doors, or they may be made to act upon bolts for fastening the doors, which bolts may be variously arranged. These arrangements may be applied to each compartment of the carriage separately, and may be made to ring bells or give other signals, such as exploding fireworks; or these signals may be brought into action by levers or handles only, without the use of the other parts of the apparatus.

[Printed, 4d. No Drawings.]

A.D. 1864, July 23.—N° 1837.

LAWSON, WILLIAM SIMPSON.—(*Provisional protection only.*)

"Improvements in railway carriages, for obtaining a communication by a buffer platform from one carriage to another of a train."

This invention consists in connecting railway carriages by means of a buffer platform placed over the buffers, projecting partially beyond them, and working in a somewhat similar manner, steps leading up to this platform, and the latter being roofed over, doors being provided at each end of the platform so as to give access therefrom to the carriages, and the seats inside the latter being so arranged as to afford a passage along the centre of each carriage. By these arrangements the several carriages forming a train are connected together, and a complete line of covered passage obtained from one end of the train to the other, affording ready communication between the passengers in the

several carriages, and between them and the guard or conductor of the train.

[Printed, 4d. No Drawings.]

A.D. 1864, July 26.—N° 1853.

LANSDOWN, GEORGE.—“A method of providing a direct communication between any guard and any passenger in a railway train.”

In carrying out this invention the patentee forms “a permanent thoroughfare or way in the interior or otherwise of each railway carriage,” such thoroughfares or ways being connected in any suitable manner, but so that “a person may pass freely from the interior of one carriage to the interior of another, or from end to end of the train with perfect safety.” In order to effect this the patentee apports off from each carriage a space capable of admitting of the passage of one or more persons along the interior of the carriage, or, if desired, along the exterior thereof, a “protected footway” being formed between one carriage and another, such footway being so arranged as to adapt itself to the various curves in the line of railway, and so as not to interfere with the efficient action of the buffers, or the necessary uncoupling of the carriages. For this purpose the patentee places at each end of each carriage a door or sliding panel, opening on to a strong footway, capable of adjusting itself so as to admit of the intervening space between the ends of the carriages being greater or less according to the motion of the train, without the integrity of such footing being interfered with so long as the carriages are connected, and such footway being protected by being enclosed or partly enclosed by boarding, panelling, or otherwise, the arrangements of such footway being varied according to circumstances.

Various modifications of the invention are described, the arrangements varying with the particular description of carriage to which the invention is applied, and the details of the invention being set forth by the aid of a number of drawings annexed to the Specification.

[Printed, 2s. 4d. Drawings.]

A.D. 1864, July 28.—N° 1882.

LIVESEY, JAMES, and EDWARDS, JOHN.—“Improvements in the permanent way of railways, and carriages for the same.”

One part of this invention consists in "a new form of buffer, " having the spiral spring fixed on the buffer rod outside, dispensing altogether with the hollow chamber usually employed," the patentee stating that by this arrangement "the buffer rod is " better supported and the general arrangement much simplified," the buffer rod behind the spring passing through a "base or " blocking piece," in casting which the patentees propose to use an elastic core, composed of a tube of wrought iron or steel, having a slit or opening in it from end to end, this tube being filled with loam, so as to form a solid core, but the slit not only allowing the tube to yield to the contraction of the metal, but to be easily withdrawn, and also allow a free escape of the confined gases. The spring itself is of conical form, the smaller end being next the buffer head, and an arrangement is described in which two such springs are used, the smaller part of one being immediately behind the buffer head, as in the first arrangement, and the larger part of such spring being in contact with the outer side of a plunger placed in a short cylinder, within which is the second spring, the larger portion of such spring being in contact with the inner side of the plunger, and the smaller portion with the bottom of the cylinder, the two springs being simultaneously compressed by the action of the buffer, but the outer being much lighter than the inner spring, and "so as to be less rigid, and sensible of "the least pressure."

The other parts of the invention do not require notice here.

[Printed, 10d. Drawing.]

A.D. 1864, July 29.—N<sup>o</sup> 1893.

LONG, JAMES.—(*Provisional protection only.*)—"Improved "mechanism or arrangements for stopping or retarding railway "and other carriages."

According to this invention a "steel spring, grip, or brake" is applied to each wheel of any locomotive, tender, carriage, or truck. Round a flange or disc, cast, bolted, or otherwise secured to the inside of a wheel, is passed this spring, one end of which is fixed to the framework or body of the locomotive, tender, carriage, or truck; "it then passes round the said flange or disc on the wheel, "and its other end is fixed to the buffer rod, which passes from "end to end of the locomotive, tender, carriage, or truck, and "works through guides or bearings. The buffer rods may be

"connected together by a cross bar (if thought desirable), so as to ensure their more uniform action."

'Thus when any diminution takes place in the speed of the engine, or the latter is reversed, "pressure is immediately brought upon the buffers," and any pressure on the buffers at either end "moves more or less the springs attached thereto, which act proportionately on each and every pair of wheels nearest thereto, thus forming a powerful skid or brake, and tending to bring the train to a stop more or less quickly as may be desired. When the pressure is removed from the buffers the springs tend to bring the buffer rods back to their normal position, and so free the wheels from the grip or brake action of the springs."

A similar arrangement is applicable to omnibuses and other road carriages. "Also by a handle or lever gearing the railway guard, omnibus conductor, or other attendant can put a stop into action and prevent the grips or brakes operating on the wheels when necessary, and by these or similar means the grips or brakes can at any time be put in or out of action."

[Printed, 4d. No Drawings.]

A.D. 1864, August 5.—N<sup>o</sup> 1951.

HEYDON, JOSEPH.—"Improvements in the means and apparatus for making the moulds in which metals are to be cast."

According to this invention "the pattern is pressed into the sand, and moulded by pressure exerted by a steam piston, or it may be hydraulic power, or even by a rack and piston or other mechanical equivalent."

An arrangement is described in which the lower half of a mould box is mounted upon a mould plate, and the latter is furnished with trunnions which are supported by arms suspended from a shaft carried by a cross beam which is sustained by pillars; the cross beam also supporting a fixed disc, immediately over the mould box, and there being below this apparatus a cylinder, and a piston therein, which may be forced upwards by steam, the upper end of the piston rod carrying a table, which is immediately below the mould plate and box. The mould plate is so formed as to receive half of the pattern, or the pattern may divide and one half only be used at a time, such half being laid upon the mould plate. This being done, the mould box is filled with sand, and an additional box or ring placed on the top of it, and filled with sand

also, this ring being used "as a measure of capacity," and holding as much sand as can be compressed into the mould. Steam is now introduced below the piston into the cylinder, the piston rises, and the table attached to it comes in contact with the mould plate, raising it and the mould box until the sand in the ring on the top of the latter comes into contact with the fixed disc mentioned above, when, the operation being continued, the disc "presses the sand down around the pattern, and rams it with sufficient hardness to form the mould," the sand in the ring being forced completely into the latter. The ring is now removed, and the piston and table are lowered, the mould plate and box are rotated upon the trunnions until the box is below the plate, the piston and table again rise and support the box, and the plate is detached from the latter (having been temporarily secured thereto by hooks), the plate and arms being now swung out of the way, and held in position by a weighted lever, until the upper half of the mould box is placed upon the lower part, which is filled with sand, and a ring placed upon it and also filled with sand as already described, a peg or pin being also placed in the sand, which is afterwards withdrawn to form the "runner," or port, for the introduction of the metal. The compression of the sand in the upper part of the mould is now effected by the ascent of the table and piston, as before, and this being done the table is lowered and the mould removed for the separation of the parts, and the removal of the pattern, the second half of which has been of course introduced into the mould before the second part of the operation.

The invention is described at some length, in some cases certain ratchet wheels, racks, springs, and pins being applied to produce "the self-acting rotation" of the mould plate on its trunnions at the proper times. Instead of steam, compressed air, the pressure of water, a rack and pinion, friction apparatus, or an arrangement of levers may be used to actuate the piston.

The invention is described and shown as being applied to the casting of a "singled flanged wheel, such as a truck or railway wheel," but may be used in the moulding of other articles.

[Printed, 1s. Drawing.]

A.D. 1864, August 5.—N° 1953.

FARRELL, ISAAC.—"Improvements in railway carriages, and  
"in breaks for the same."



This invention consists in the first place of apparatus by which the simultaneous opening and closing of all the doors on one side of a railway carriage may be effected at one operation, this apparatus consisting of a rod passing longitudinally along the carriage framing, and attached thereto by staples or sockets in which it is capable of sliding to and fro, and also of rotating, being provided with a handle by which it may be moved backwards and forwards when it is necessary to open and close the doors, which it is made to do through the medium of levers mounted upon pins or pivots fixed to the floor of the carriage, one end of each of such levers being connected by a pin joint to a socket carried by the sliding rod, and the other end carrying two studs, one of which is outside and the other inside the door, near the part which is hinged to the carriage, the result being, that upon the rod being made to slide in one direction the stud inside the door is made to open it, while on the rod being moved in the other direction the stud outside the door is made to close it, a "sneck" or suitable fastening then securing the door, such fastening being operated upon as the rod is moved to and fro by one of the studs in the lever. The longitudinal rods of one carriage are connected with those of another by coupling bars and socket joints. The sole object of the longitudinal motion of the rods is to open and close the doors of the carriages, the application of the couplings between carriage and carriage enabling all the doors of the carriages of a train to be opened and closed at once, but the object of the rotary motion of the rods is in the first place to establish a communication between the guard and the engine driver by bringing into action "any" suitable or well-known alarm apparatus," and in the second place to apply breaks to some or all of the wheels of the carriages of a train. The break blocks may be of any suitable form, but are placed so as to work vertically between guides, each block being supported by an upright spindle which rests upon and is secured to the axle box or bearing, the upper end of this spindle being provided with a screw thread which works in an internal screw or tapped hole in the cheek of the break block, so as to force the latter down upon the wheel when the spindle is rotated: such rotation being effected by means of an endless screw carried by the longitudinal rod already mentioned, and gearing with a worm wheel on the upper end of the upright spindle.

When the longitudinal rod is applied for opening and closing the doors, the couplings and break apparatus are dispensed with;

while when applied for the purpose of giving signals and applying breaks the appliances for opening and closing the doors are dispensed with.

[Printed, 10d. Drawing.]

A.D. 1864, August 16.—N° 2038.

MILLIGAN, WILLIAM.—(*Provisional protection only.*)—"An apparatus for communicating motion from one railway carriage to another in a train, applicable for signaling between passengers, guard, and driver; fastening and unfastening the carriage doors, working the breaks, and other purposes."

This invention "consists of a shaft placed longitudinally along the roof or other convenient part of each carriage in suitable bearings, and capable of rotating therein, and a boss fixed on each end of the shaft, or in connection therewith, with one, two, or a series of arms projecting at right angles or other suitable angle from the shaft. These arms may be joined together at their extremities by a rim, and thus form a wheel. One arm in each is either provided with a stud pin projecting outwardly, and capable of ready removal, or the arm is constructed with a joint, so that part of it may be turned outwardly, and thereby form a projecting pin. These arms are so fixed on the shafts that when the several carriages in a train are in position the projecting pin on one shaft will enter betwixt the arms on the adjoining shaft, and thereby form a connection or loose coupling of the shafts of each carriage, and consequently when motion is given to any of the shafts it will be communicated to all the others in a train. These shafts may be employed by the passengers to signal to the guard and driver by having a pulley, lever, or other appliance connected with the said shaft over each compartment of a carriage, with a cord, chain, strap, rod, or other suitable apparatus attached thereto, and passing into the interior of the carriage, so that by actuating such apparatus the shafts will be put in motion so as to agitate a bell at each end of the train, or cause to be produced any other signaling effect." The guard and driver may put the shaft in motion by means of a handle or wheel provided for the purpose, or by using the coupling arms or wheels themselves. "The fastening and unfastening of the carriage doors may be effected by levers and rods, racks and pinions, or other suitable appa-

"ratus in connection with such shafts;" and the breaks may be also "worked by such shafts in connection with any ordinary apparatus, and this means admits of a separate break being applied and worked on each carriage in a train."

[Printed, 4d. No Drawings.]

A.D. 1864, August 18.—N° 2049.

CLARK, WILLIAM.—(*A communication from Adrien Cabarrus.*)—(*Provisional protection only.*)—"Improvements in apparatus for transmitting motion and power from one part of a railway train to another, for the purpose of effecting communication between the passengers and guard, or otherwise, and for operating the brakes."

This invention relates to "the application of small buffers in connection with the ordinary buffers of railway carriages, and bearing one against the other in a similar manner when the carriages are brought up close together. These small buffers, which are placed on one side, one at each end of a carriage, are connected together and set in action" "by means of levers, small chains, iron rods, or otherwise, and may be applied either above, below, or at the side of the ordinary buffers. The chains, levers, or other means of connecting said auxiliary buffers together are likewise placed either below or on one of the lateral faces of the buffer plank; they, however, require to be applied in a similar manner throughout a train."

An arrangement is described in which the small buffer "is carried from the large one by a strong iron frame solidly fixed at one end to the buffer, and at the other to the side of the small buffer by means of a hinge," from which point proceeds a horizontal arm which is connected to a lever acting upon a bent lever having a vertical arm, the latter, again, being connected by means of a rod or wire with a similar bent lever at the other end of the carriage, the result being that if one of the small buffers is pushed back, the other will be forced forward, being connected with a horizontal arm and other parts similar to those already mentioned as being combined with the first, the horizontal arms being grooved, and acting upon the other parts through the medium of bolts sliding in such grooves to the extent of the to and fro motion of the buffers. In another arrangement one of the small buffers is connected to a bent arm, to one part of which a chain is

connected, which passes below the carriage and is attached to a projection on the other small buffer, this arrangement being simpler than the first.

By connecting chains or wires to one or other of the arms or levers used in these arrangements, and passing such chains or wires into the carriages so as to be within reach of the occupants, the latter may impart motion to the apparatus and so ring a bell in the guard's van, and by the employment of a lever which is mounted on the large buffer at the rear of the locomotive the driver may act upon the small buffers of all the carriages, and by means of a chain connected with one of the levers of the apparatus, bring into action certain weighted levers which apply the brakes to the wheels of the carriages.

[Printed, 8d. Drawing.]

A.D. 1864, August 18.—N° 2052.

COTTON, CHARLES. — (*Provisional protection only.*)—"Improvements in railway carriages, to facilitate the communication of passengers from carriage to carriage of a railway train."

According to this invention "the ends of railway carriages are made with openings through them, from which portions of tubular passages project, so that when two carriages are connected together a complete opening or passage will be formed between the hinder part of one carriage and the fore end of the next carriage, by which a passenger in the one carriage may communicate through the tubular passage to the passenger or passengers in the next carriage, and thus may communications from passengers in one carriage be readily transmitted by the passengers in other carriages to the guard and engine driver with facility in any case where such communications become desirable or necessary." Where carriages are divided into compartments, passages from one compartment to another are to be provided in addition to those in the ends of the carriages.

[Printed, 4d. No Drawings.]

A.D. 1864, August 18.—N° 2054.

SWIFT, FERDINANDO.—(*Provisional protection only.*)—"Improvements in the construction of axles and axle boxes."

This invention consists of improvements upon the invention for which Letters Patent were granted to the present inventor on

the 1st of January, 1856, No. 2. In the present invention he forms a frame of convenient shape, which is made to extend across the under side of the carriage, there being placed at or about the centre of this frame, and midway between the wheels, an axle box. Each wheel has a separate and distinct axle, which is made, by preference, "somewhat conical or tapering, that is, smaller "near the centre than at the wheel end," the inner end of each axle being supported in the axle box mentioned above, the outer ends of the axles passing through brasses or bearings, outside which the wheels are keyed; "or the spokes of the wheel are "inserted in lumps formed on the end of the axles. Hence it "will be seen that each wheel revolves with its axle, which, being "supported at both ends" renders the motion of the wheel steady.

When these axles are applied to a railway carriage, "the axles "traverse a tubular frame, and each wheel being fitted to a separate and distinct axle, great facility is afforded for passing "round curves." The central axle box is formed in two parts, with sockets or receptacles for the reception of enlarged portions or lumps formed on the inner ends of the axles, and when the parts are placed in their positions, the two portions of the box are secured together by certain plates and nuts and screws, other plates being employed for receiving the outer boxes of the axles, and the apparatus being provided with suitable apertures or receptacles for the introduction of lubricating matter to the boxes.

[Printed, 4d. No Drawings.]

A.D. 1864, August 24.—No 2094.

MATTHEWS, JAMES.—(*Provisional protection only.*)—"Improved apparatus for retarding and stopping trains on railways."

According to one mode of carrying out this invention, two metal cylinders are fitted to the frame of the locomotive engine of a train, or of one or more of the carriages or waggons of a train, such cylinders being provided with pistons or plungers, which are severally connected to cranks on the axle or axles, the rotation of which it is intended to retard or arrest. These cylinders may either be situated on opposite sides of the axle, or both on the same side. In the former case, the cranks will both point in the same direction, while in the other case the cranks will point

in opposite directions, "the object being to cause one of the two " pistons to move outwards whilst the other is moving inwards," Each cylinder is provided at one end with a clack or valve opening inwards, and communicating with a water tank, a second valve being also fitted to each cylinder, which valve is capable of being more or less opened at the will of the guard or driver, and also communicates with the tank, a stop-cock preventing the inlet of water into the cylinders, "so long as the train is not required " to be retarded." When, however, this is the case the stop-cocks are opened, and the cylinders are instantly filled with water, and by the arrangement of valves already mentioned, such water is made to exercise a more or less powerful resistance to the motion of the pistons, and consequently to the rotation of the axle. A safety valve may be fitted to each cylinder, in order to prevent rupture, in case the adjustable valve should happen to be entirely closed. According to another arrangement each cylinder may communicate at both ends with a closed tank by means of adjustable slide valves. "When the apparatus is to be put in action, " the adjustable slide valves are fully opened, and the water then " enters and fills each end of the cylinder. The valves are now " partially or entirely closed, so as to confine or lock the water " inside the cylinder, and thereby offer a considerable resistance " to the motion of the piston in both directions."

[Printed, 4d. No Drawings.]

A.D. 1864, August 30.—N° 2130.

CLARK, WILLIAM.—(*A communication from Jacques Antoine Barthélemy Balbi and François Pommerol.*)—"Improvements in " railway apparatus for the better prevention of collisions and " other accidents."

This invention consists, firstly, in placing along both sides of a line of rails, stops or catches about one hundred yards apart, such stops or catches being mounted on pivots, and connected together by metal rods, and being capable of moving into either vertical, horizontal, or inclined positions, the arrangement being such that those on one side of the line may be placed in a horizontal position, leaving that side of the line clear, while those on the other side are vertical, and adapted to act upon an oscillating stop piece, with which each locomotive engine is furnished, such stop piece, when so acted upon, shutting off the steam from the



cylinders of such engine. The result of this arrangement is that trains can travel upon the line in one direction only, as if by accident two trains should get upon the same line and be approaching each other, one of them will be stopped by the vertical catches shutting off the steam from the engine, while that of the other train may also be shut off, if requisite, by raising the catches on the other side of the line.

Another part of the invention relates to a means of instantly disconnecting an engine from a train, and so affording further security to that already attained by cutting off the steam. "For this purpose the engine is provided at both ends with a coupling, which is connected to the carriage by simply backing the engine thereon, and consists of a jointed arm, having a double hooked or arrow head taking into a similar part fixed on the end of the carriage, the hooked end being retained in position by a weighted arm in connection with the stop piece before mentioned." The movement of the latter in shutting off the steam has the effect of disengaging the couplings, thus detaching the engine; and the same result would follow if the engine left the rails, the stop piece then becoming embedded in the ground. Another part of the invention consists in applying couplings, such as those mentioned above, to the different carriages of a train, such couplings then serving as substitutes for the ordinary draw bars, and being connected by central rods to the buffer springs, the brakes of the carriages being also so combined with these arrangements that they are "held out of gear so long as the train is in motion, and applied by the self-action immediately the tractive force ceases."

Another part of the invention consists in an improved guard, which is to be applied in front of a locomotive for the purpose of removing snow or other obstructions from the rails, this guard being "of tapered form, and the sides being spread so as to cover the front of the travelling wheels."

The details of the invention are very fully described, modifications of the first and second parts in particular being set forth as applicable to guarding a train which may break down, by preventing the advance of a following train, as well as for "ensuring the safety of a train in motion, and also for protecting it from succeeding trains, with a view to prevent collisions."

[Printed, 1s. 6d. Drawings.]

A.D. 1864, September 6.—N° 2182.

CURTIS, WILLIAM JOSEPH.—(*Provisional protection only.*)—  
“Improvements in railway carriages, and in the means to be  
“employed by passengers in signalling to the guard of railway  
“trains.”

This invention relates in the first place to the use of percussion signals, which may be ignited by railway passengers in order to draw the attention of the guard to any particular carriage of a train. The signal is produced by the use of two tubes, placed end to end, one of them being filled with explosive powder and tipped with percussion composition, while the other is charged with pyrotechnic composition. One of these signals is to be placed in each compartment of each carriage, resting in a tube or box, which has an open end projecting through the carriage, and is furnished with a propeller, consisting of a spring, which is held by a catch until it is desired that the signal shall operate, when, the catch being released, the spring drives the signal forward, the explosive part being discharged by the action of a hammer at the end of the box, and breaking away from the other part, the part containing the pyrotechnic composition protruding from the box and becoming ignited, giving out a light which will show from which carriage the explosive part has proceeded. Instead of a hammer, friction may be used to discharge the latter, and the other portion may be provided with a handle, by which it may be held out of a carriage window.

The improvements in railway carriages consist in fitting under the threshold of each carriage, and at each side thereof, a folding platform, composed of bars hinged together so as to admit of being let down for use, or folded back so as to clear the platforms or other erections with which they might interfere in the working of the railway. By the use of these platforms, a guard may reach any carriage of a train when in motion.

[Printed, 4d. No Drawings.]

A.D. 1864, September 7.—N° 2184.

WARD, WILLIAM HENRY.—(*Provisional protection only.*)—  
“Improvements in tramways, and in carriages to be used upon  
“them, the same being applicable to railways and their carriages.”

This invention consists in the first place in the use of one or more parallel grooved rails, so constructed "as not to cause any unevenness of roadway," and which are "placed in the road-bed with their grooves upwards," these grooves admitting flanges, with which the wheels of the vehicles are furnished. Passenger (or other) vehicles are constructed with a central passage along the inside, the seats being arranged on each side of the passage, and the backs of the seats being so contrived as to turn over, "so as to face forward or backward agreeable to the occupants' pleasure," suitable footboards being also provided. The saloon or passenger part of each carriage is placed upon "trucks," with which it is connected by central ring bolts, the body of the carriage resting upon rollers which are placed around such ring bolts, this arrangement affording great facility for passing round curves, the trucks being connected by segment or other gearing, in such manner that when one truck diverges from a straight line of rails into a curve, a corresponding movement is given to the other truck in the opposite direction. This may be effected, however, by the use of cross connecting rods instead of gearing. Vehicles meant to be drawn by horses are so contrived that the pole or tongue to which the horses are attached may be disconnected from the vehicle by means of a "hand rod," within reach of the driver, and upon which he may operate "without a change of place or position." Each truck is furnished with brakes, which may be operated upon by means of a hand wheel or crank fixed on a ratchet wheel shaft, a cord or chain, or rods and levers, connecting the shaft with the brakes. Cleaners or scrapers are applied to the trucks for the purpose of cleansing the grooves in the rails and removing obstructions therefrom.

Vehicles are described as being provided with doors at each end, so that a guard or other person may pass from end to end of a train of vehicles while in motion, and windows are provided at the ends of the vehicles as well as at the sides, by which means the passengers of one carriage may see into that next them, the brakesman being also enabled "to look in and learn if all is right within." Steps are so arranged as to enable persons to enter and leave the carriages at either end, on either side, and a "bell-pull and bell arrangement is provided," by which the passengers of any carriage may call the attention of the guard or driver of a train when necessary.

[Printed, 4d. No Drawings.]

A.D. 1864, September 8.—N° 2191.

CHATTERTON, RICHARD DOVER. — (*Provisional protection only.*)—"Improvements in coupling apparatus."

This invention "is particularly intended for use in coupling railway carriages and wagons, but is applicable for other purposes where couplings are required."

In applying the invention to railway carriages, the inventor forms the outer end of the draw bar at each end of each carriage "with a bell or open mouth," at the back of the upper side of which is mounted excentrically "a semi-cylindrical or other shaped block, which, in its normal position, partially closes the mouth at back, but when pushed from the outer end, rises by turning on its axis and leaves the mouth clear; it falls again of its own weight when the pressure is removed. A cord, chain, or other contrivance leading to the side or other part of the carriage is attached to the back of the semi-cylindrical block," for the purpose of raising such block when necessary.

In order to connect two carriages provided with draw bars, as already mentioned, the inventor uses "a detached coupling bar, with enlarged ends;" this bar being, by preference, attached by a short chain to the draw bar, and in practice thrust into the bell mouth of the draw bar at one end of each carriage, when the semi-cylindrical block will be raised to allow the enlarged end of the bar to pass, and will again fall upon the bar in front of it, whereby the bar will be safely held. "When the end of a carriage in which a coupling bar, placed as just mentioned, comes against the end of another carriage with a bell-mouthed draw bar, the outer end of the coupling bar in the first carriage enters the bell mouth of the draw bar of the second carriage, and becomes secured therein by the semi-cylindrical block," the coupling of the carriages being thereby effected. In order to uncouple the carriages, "the cord, chain, or other contrivance before referred to is acted upon to raise the semi-cylindrical block, when the coupling bar will be set free, and the two carriages may be drawn apart."

This coupling apparatus is also applicable for securing the pole or shafts to the body of a common road carriage, the back end of the pole (for example) being formed with a projection, which enters an aperture in the front of a box attached to the axle-tree

or other convenient part, a semi-cylindrical or other shaped block being "fitted excentrically in the box," and holding the pole in position "by coming down in front of the projection." For vehicles with shafts, there may be a coupling for each shaft, or a longitudinal bar may be carried back from the splinter bar and secured to a single coupling. A cord or other contrivance within reach of the driver leads to the semi-cylindrical block, "in order that the poles or shafts may be immediately released if required."

[Printed, 4d. No Drawings.]

A.D. 1864, September 14.—N<sup>o</sup> 2240.

SKELDON, PETER.—(*Provisional protection only.*)—"Improvements in antifriction bearings for shafts or axles."

According to this invention a series of antifriction rollers are placed between the end of the shaft or axle and the bearings of the plummer blocks or box in which the end of such shaft or axle works. The length of each roller is nearly equal to that of the neck of the shaft or axle, and the rollers are placed in a circular frame of somewhat larger diameter than that of such neck, the frame being composed, by preference, of two semicircular parts hinged together. The frame may be fitted either on the end of the shaft or axle, or in the bearings, the rollers occupying the space between the latter and the shaft or axle. As the latter rotates, the rollers rotate also, the only rubbing surfaces being the ends of the rollers in the frame, the friction of the parts being thus very small.

The invention is mentioned as being applicable to railway and other carriages, as well as to locomotive engines, marine and stationary engines, and all kinds of shafts or axles with large bearings.

[Printed, 4d. No Drawings.]

A.D. 1864, September 16.—N<sup>o</sup> 2258.

HEY, JOE GREEN.—"An improved means of and apparatus for lubricating the axles of 'corves' or carriages employed for conveying coal or other material from pits and mines."

This invention is carried into effect as follows:—"To the outer face of each wheel of the corf or carriage is cast a dome-shaped

“ cup or receptacle for oil, forming one-half of the boss in which the axle works. On the inner face of each wheel is a similar domed-shaped cup or receptacle (secured thereto by bolts or other suitable means), having a pap or projection cast thereon through which is a pipe placed at an angle and reaching to the under side of the axle, a hole being bored vertically in the pap or projection and communicating with the above-mentioned pipe for the purpose of supplying the dome-shaped cups or receptacles with oil, a second pipe serving as an overflow or gauge to regulate the quantity of oil supplied; the dome-shaped cups or receptacles enclose a boss in which the axle works, one or more holes being bored through the boss; oil flowing through the hole or holes will lubricate the axle. In discharging coal or other matter the corves or carriages are frequently inverted, the oil receptacle above described being also inverted will effectually lubricate the axles without the waste consequent upon the plan or method of lubricating by hand.”

These arrangements are mentioned as being applicable to the lubrication of the axles of railway carriage wheels, loose pulleys, and other wheels.

[Printed, 10d. Drawing.]

A.D. 1864, September 17.—N° 2285.

SLAUGHTER, EDWARD, and CAILLET, FERDINAND LOUIS FÉLIX.—“Improvements in locomotive engines.”

The first part of this invention relates more particularly to facilitating the passage of locomotive engines along curves in the rails upon which they travel, and consists in arranging the axle boxes of such engines “so that they can slide in their guides not only vertically as heretofore, but also laterally a short distance either way,” certain springs being employed “which tend to keep the axle boxes midway between the limits of their lateral travel, and the wheels ranging correctly for running over a straight road. When the engine arrives at a curve the pressure of the rails on the wheel flanges overcomes the springs, and the wheels, with their axle and axle box, move sideways and adjust themselves to the curve.”

Another part of the invention relates to such an arrangement of the engine that “the carrying springs are under the axle,”



such springs being by preference connected with the axle box by links, jointed at each end so as to allow of the sideways travel of the axle without displacing such springs. And a third part of the invention consists in arranging the axles so that they may slide through the boxes, a collar being applied to the axle between the boxes, and springs on each side of this collar tending to keep the collar and axle in a central position; this arrangement being capable of serving as a substitute for the arrangement first mentioned.

[Printed, 2s. Drawings.]

A.D. 1864, September 19.—N<sup>o</sup> 2295.

SIEVIER, ROBERT WILLIAM.—“Improvements in wheels, and “arranging them on their axles or shafts.”

This invention consists, firstly, “in causing the wheels of locomotive engines, carriages, or waggons to be elastic (if such a term may be used) by enabling the wheel itself to lay down an elastic or spring railway as it travels along the ordinary railway, “by which means the wear and tear of two rigid bodies is in a great measure prevented, and also the shocks caused by the “unevenness of the line greatly reduced.”

A mode of carrying out the invention is described, in which the ordinary driving wheel of a locomotive engine has fixed upon its exterior circumference blocks of wood or metal, one block being directly opposite the end of each spoke, and there being placed around these blocks a flat steel ring. On the outer part of this ring are also placed wooden or metal blocks, these coming between the parts opposite the ends of the spokes, the steel ring being kept in its place by pins or otherwise, and the tyre of the wheel being placed upon the last-named blocks, such tyre being, by preference, of steel. “This tyre being entirely free to expand and “contract, would not be liable to break, as is the case at present, “causing very serious accidents.” If preferred, the blocks between the tyre and the steel ring may be attached to the tyre, and the ring may be loose, but in that case the tyre must be kept in its place by suitable means. The patentee states that he should prefer a driving wheel thus constructed to be without a flange, the other flanged wheels keeping the engine on the rails, or a tyre might be fastened on one side of the periphery of the wheel, and the other side have a piece of less width. When these elastic

wheels are placed on locomotive engines or ordinary railway carriages one is, by preference, a loose wheel, but if applied to vehicles for ordinary roads both wheels may be loose on the axle.

Another part of the invention consists in a mode of arranging the wheels of locomotive engines, carriages, and waggons, so that one wheel shall be loose and the other fast upon the axle, the wheels thus being capable of travelling at different speeds when passing round curves in the rails, the loose wheel having a groove in the interior of the eye or nave for the reception of lubricating material, which may be introduced thereto by means of a hole leading to the outside of the nave, and fitted with a screw plug.

[Printed, 8d. Drawing.]

A.D. 1864, September 22.—N° 2328.

CLARK, JOHN. — "Improvements in axle boxes, and the means of operating the same, and in break blocks used therewith."

This invention consists, firstly, in causing "the end axles of railway carriages, wagons, and engines to incline to the centre of the curves of the rails in radial lines by the lateral motion of the centre axles." An arrangement is described in which the central axle works in boxes which are capable of sliding laterally beneath bearing bars, these bars being fitted between round axle guards, and form the bearings for the centre springs, which are seated upon saddle-flanged sides. The central axle boxes are provided with lugs, to which links are jointed, such links being also jointed to bell-crank levers centred upon the round axle guards, which levers, again, are jointed to connecting rods which unite them to the axle boxes of the fore and aft axles, the result of the whole arrangement being that when the central axle moves laterally, owing to a curve in the rails, the connecting rods cause the other axles to incline to the centre of such curve, as required.

Another part of the invention consists in a mode of diminishing the friction of axles by employing a bearing box which is composed of a hollow cylinder, through which the axle passes, the latter being of less diameter than the interior of the cylinder, and the space between them being filled by a number of small balls in contact with and upon which the axle works.

Another part of the invention is set forth as consisting in a mode of causing the break blocks to follow the radial motions of the axles. No description of this is given in the Final Specification, but according to the Provisional Specification this object is accomplished by mounting the blocks on the same side of a pair of wheels in couples, connected by a rib, to the centre of which the draw bars "or other media" are attached, the back straps of the breaks being suspended from longitudinal or cross bolts, fixed to the framing, along which the breaks slide "as the wheel diverges from the square."

The invention also includes a mode of causing the leading wheels of a locomotive engine to radiate laterally in passing round a curve by the use of a sliding axle box, placed upon the centre of the leading axle, and connected to a longitudinal radial arm, working upon a pin fixed in the framing of the engine.

[Printed, 8d. Drawing.]

A.D. 1864, September 29.—N<sup>o</sup> 2401.

**LINDSLEY, GEORGE.**—"Improvements in break blocks."

This invention consists "in introducing at intervals into the surface of the ordinary wooden break block a gritty composition, which not only increases the durability of the block, but also affords additional biting or gripping power, or increases the friction between the block and the wheel."

The patentee states that he does not limit himself to any particular form of recess or aperture for holding the composition in the blocks, nor to any one composition, but that he finds a very good form of aperture to be a circular hole extending through or nearly through to the back of the block, and "at an angle with the face" of the latter, a suitable composition for filling the apertures being composed of a mixture of sand and resin, "applied hot, and allowed to cool in the apertures."

The invention is applicable "to all purposes where wooden break blocks may be used."

[Printed, 4d. No Drawings.]

A.D. 1864, September 30.—N<sup>o</sup> 2404.

**HENSON, WILLIAM FREDERICK.**—"Improvements in railway carriage buffer and other springs."

According to this invention springs are constructed "of a conical, conoidal, or oval form, with tapered bars of steel of various sections, applicable for railway carriage buffer and other springs, which may be constructed of any section of steel other than tapered, such as oval, or half oval, of hollow or half hollow bar steel, which may be tapered or otherwise." The chief feature of the invention is set forth as consisting in "the formation of a spring made in a conical form, having two or more of its coils sunk or inverted from the apex of the spring to the inner cone or coils of the conical spring, so as to form an elastic base or cushion, to prevent breakage," or from the spring being overstrained or overworked at any time when acted upon, the spring being also increased in power "by the inner cone or coils of steel forming an elastic conical base to the outer conical spring. The springs may be constructed of twisted steel bars or wires of any convenient sizes, and thus form a bar suitable for coiling. The inverted cone of the conical spring may be constructed of flat or oblong bar steel, so as to form an inner volute spring to the outer conical spring. The springs may also be made parallel, having an inner conical spring of tapered bar steel or otherwise."

"The method of constructing the spring may be varied as found most convenient," and such springs may be placed in boxes, suitably formed for adapting them either to railway or other purposes.

[Printed, 8d. Drawing.]

A.D. 1864, September 30.—N<sup>o</sup> 2415.

CLARK, WILLIAM.—(*A communication from Constant Jouffroy Duméry.*)—"Improvements in vehicles."

The object of this invention, as regards railway carriages, is "to dispense with the connection between the wheels without losing the advantage of journals and fixed bearings," and to "diminish the amount of friction on each of the journals or pivots by doubling their number;" while for ordinary vehicles journals turning in fixed bearings are substituted for boxes rotating on fixed journals; in both kinds of vehicles "the lateral play caused by the angular motion of the axle" being obviated or lessened; large wheels are applied to low vehicles; and each fore wheel is pivoted upon an independent vertical axis, "so as to admit of the

" vehicle being turned without displacing the centres of support of the fore wheels." In order to obtain these results a kind of " elastic parallelogram " is formed, " which is composed of two, three, or four springs, and connected near its centre to a rigid fork forming the bearing, and transmitting a uniform and simultaneous deflection from the several parts of the elastic parallelogram. The plates of the springs composing said parallelogram are fixed or rather jointed at their ends to the fixed parts of the body, and as their elasticity can only be utilized in one direction, while laterally and longitudinally they are completely inflexible, the wheels and body of the vehicle can only move vertically."

The invention is described under a great variety of modifications, the advantages of the arrangements set forth over those ordinarily adopted for supporting and suspending vehicles, both for railways and ordinary roads, being pointed out.

[Printed, 1s. Drawings.]

A.D. 1864, October 3.—No 2429.

**BATEMAN, SAMUEL.**—"Improvements in brakes for railway carriages."

This invention consists in throwing " pressure in a continuous manner on the peripheries of plain or cog wheels attached to the running wheels, as well as on the rails," the patentee stating that by this means he obtains " a sliding rotative motion instead of the ordinary sliding motion on the surface of the rails. For this purpose, on the same axis, and on the external or inner sides of the running wheels of a railway carriage, are cast two plain wheels; between the axes of two pair of wheels another axis carrying at each extremity a similar wheel is set," the patentee calling these intermediate wheels, the axis of the latter being, " when free, more elevated than the axis of the running wheels. On each end of the intermediate axis is fixed a vertical shaft, receiving the required pressure either from a lever provided with a cam or from a screw. One end of a spring is maintained on the upper part of the vertical shaft and under the cam of the lever, and serves to keep the axis of the intermediate wheels in a more elevated position than the axis of the running wheels. When it is necessary to lessen the speed, or to stop a train running with full steam, the aforesaid lever is

"pressed, which then presses down the vertical shaft of the axis of the two intermediate or plain wheels, the peripheries of which are thus brought to bear on the peripheries of the four additional wheels of the four running wheels, as well as upon the rails. The rotative motion of these working wheels is gradually lessened according to the force of the pressure the peripheries of the additional wheels receive from the intermediate wheels, with which they turn in a contrary direction."

"It will easily be seen that the greater the pressure that the intermediate wheels receive from the lever, the deeper they will enter between the peripheries of the additional wheels." "It thus follows that the rotative movement of the running wheels being prevented by the two wheels set on their axes the train is effectually stopped without any sudden and violent jerks, thereby preventing accidents."

[Printed, 8d. Drawing.]

A.D. 1864, October 11.—N° 2509.

WATKINS, FRANK.—(*Provisional protection only.*)—"Improvements in the construction of railway carriages."

This invention relates to a mode of constructing railway carriages whereby greater strength will be acquired to resist the force of collision, and the carriages be enabled to travel with less resistance from atmospheric pressure than is usual. The body of the carriage is of an oval or egg shape, with transverse plankings for the top and sides, "and beams below on same principle." Above the ordinary windows are glazed openings or sky lights, and at each end of the carriage two or three similar lights, and corresponding lights in each of the compartments "so as to form a direct line of windows throughout the train; these windows are to hang on a pivot and swing open vertically like the air window of a church." The doors of the carriage are arranged to slide within a casement in the ribs of the vehicle, and if there are no compartments one door will suffice, "so as to obviate the necessity for curved glass, the door being in the centre of the carriage, where the curve is reduced to a minimum." The bottom of the carriage may, if preferred, be flat, and hand rails are placed all round the vehicle, the guard's look out being at the side instead of the top. The upper part of the carriage may contain compressed gas for lighting the interior.

[Printed, 4d. No Drawings.]



A.D. 1864, October 14.—N° 2537.

**MEULEMANS, PETER.**—(*Provisional protection only.*)—"Improvements in railway wagons and carriages."

In this invention a gallery is formed on the outside of each wagon or carriage, by which a person may pass from one to another whilst the train is in motion, there being a break handle on the outside of each carriage, so that a person on the gallery, by turning the handle, may apply the breaks in the ordinary manner. Below the tender is a perforated tube or vessel, from which water may be supplied for laying the dust on the railway, or any other purpose.

The gallery of one carriage is connected with that of another by means of a footboard having a hinge at one end, which can thus be raised and lowered when requisite, each gallery being provided with a hand rail, and, if desirable, being so hinged to the carriage as to be capable of folding up against the sides of the latter.

[Printed, 4d. No Drawings.]

A.D. 1864, October 14.—N° 2541.

**CLARK, WILLIAM.**—(*A communication from Pierre Etienne Proust.*)—"Improvements in the means of lubricating, and in apparatus for the same."

"These improvements are applicable to all frictional surfaces, but particularly to rotary engines. The principle is the same in all cases, which consists in the simultaneous application of grease and water to the shaft journal or axle; the fatty matters employed may consist of lard, suet, or other lubricating substance. The effect of the rotation is to cause the grease and water to intermix and form an unctuous compound, which is ground between the frictional surfaces and adheres thereto, the fatty matter especially never or seldom becoming detached, the water alone having a tendency to run out at bottom. Thus the grease box will require feeding but rarely, while the water on the contrary should be supplied almost continuously, although but in small quantity; a slight but continuous leakage will also prove very advantageous. The water reservoir is supplied from time to time in the usual manner of feeding oil reservoirs. The water which falls to the bottom may be

" allowed to escape, if desired. There is, however, greater  
" advantage in confining it at the lower part of the axle box,  
" as the small quantity of fatty matter there collected will float  
" on the top of the water. The presence of the water below the  
" rotating axis also tends to prevent its heating, as also the  
" bearing, and when the lower reservoir is full the fat which  
" floats is again passed between the shaft and the bearing," the  
patentee stating that this mode of lubricating " is particularly  
" applicable for the lubrication of locomotive and other wheel  
" axles."

The details of the invention may be varied.

[Printed, 8d. Drawing.]

A.D. 1864, October 17.—N° 2562.

HENRY, MICHAEL.—(*A communication from Charles Badin.*)—

" Improvements in the means of or apparatus for reducing the  
" friction of moving parts of carriages, engines, machinery,  
" and apparatus."

" On the shaft or other moving part or appliance whereof the  
" friction is to be reduced is a collar or ring, which works against  
" a moving or turning plate or surface employed in combination  
" with balls which work between the moveable plate and a fixed  
" plate, and are moved by the former, which is itself actuated  
" by a collar or ring."

A mode of applying the invention to a railway or other carriage axle is described in which a collar is formed at the end of the axle, upon which collar rests a moveable or revolving plate, the centre of which is, however, considerably outside the end of the axle. Upon this revolving plate are balls, arranged and kept at equal distances asunder, and upon these balls rests a fixed plate, an arm projecting downwards from the framing of the carriage passing through the centre of each plate, the spring of the carriage being immediately above the collar on the axle) and the ball upon which the weight of the carriage rests for the time being, the rotation of the collar on the axle causing rotation of the moveable plate, and of the balls on their axes.

Similar apparatus is described as being applied to reduce the friction of a shaft.

[Printed, 8d. Drawing.]

A.D. 1864, October 20.—N° 2601.

WHITLEY, JOSEPH.—(*Provisional protection only.*)—"Improvements in railway wheels."

This invention consists, firstly, in a mode of dovetailing the tyres of railway wheels into the felloe by which the tyres are allowed "an independent motion," which enables them to accommodate themselves to the curves upon or round which they may "have to travel."

The bottom and one side of the felloe of the wheel are in one piece, the inner side of the felloes inclining towards the bottom, the top of the tyre having a "tongue to dovetail into," between the fixed side felloe and a corresponding moveable side felloe; "the top of the tongue comes in contact with the bottom of the central part of the felloe, and the side pieces bear on the top of the tyre at the sides of the tongue." The tyre is prevented from flying off by means of a moveable locking side felloe piece, inclining inwards towards the bottom and forming with the fixed side of the felloe a dovetail groove, the locking piece being secured by bolts passing through the lower part of the felloe, the fixed and the moveable sides, the bolts having nuts upon them and pins passed through them outside the nuts. The mode of forming the dovetail groove in the felloe may be varied.

Another part of the invention consists in securing tyres to wheels immoveably by means similar to those mentioned above, the securing bolts being in this case passed through the sides and through the tongue on the tyre.

[Printed, 4d. No Drawings.]

A.D. 1864, October 22.—N° 2618.

BIRD, HENRY.—"Improved methods of and apparatus for stopping locomotive steam engines and railway carriages by the application of steam power to the working and management of railway breaks."

Three forms of breaks and break apparatus are used. The first is termed "the engine break." In this case a steam cylinder is placed vertically under each of the front buffer beams of the engine, there being in each cylinder a piston, the rod of which is connected to a sledge break, and the arrangement being such that on the depression of the piston by the admission of steam to

the cylinders the sledges are forced down upon the rails, and at the same time break blocks pressed against the front wheels of the engine. Steam is admitted to the cylinders, and also discharged therefrom when necessary by means of pipes and three-way cocks, springs raising the pistons when the steam is discharged.

Another arrangement constitutes "a single carriage break," a double-action steam cylinder being in this case fixed crosswise below a carriage, there being in this cylinder two pistons, and the arrangement being such that on steam being admitted to the cylinder the pistons are forced asunder, and force breaks against the wheels of the carriage through the medium of springs. Steam may be applied to the cylinder either from the boiler of the engine, or from a small boiler placed in the vehicle to which the apparatus is applied, and thus either the engine driver or the guard of the train may work the break.

Another part of the invention consists in a "connecting or train break." In this case a steam cylinder is placed longitudinally beneath the tender, there being in this cylinder a piston, having a rod which projects through each end of the cylinder, one end of the rod being connected with apparatus by means of which straps or belts are pressed upon drums fixed upon the axles of the tender upon the admission of steam to the cylinder, while the other end of the rod is connected with apparatus of a similar character by which other straps or belts are pressed upon the wheels of the carriages, such rods and couplings uniting the apparatus of one carriage with that of another. Instead of working these straps by steam they may be worked by hand, if desired, and the details of the different parts of the invention may be variously modified.

[Printed, 18d. Drawing.]

A.D. 1864, October 27.—N° 2662.

CRAVEN, JOHN, and FOX, SAMSON.—(*Provisional protection only.*)—"Improvements in railway rolling stock and agricultural " and traction engines."

This invention relates to the axles and bearings of railway rolling stock, and agricultural and traction engines, the wheels being each fixed upon a separate axle, and the inner ends of the axle of each pair of wheels being supported in moveable bearings

carried by the ends of a connecting link, or the two arms of a lever placed intermediately between the two wheels, and mounted upon a fixed stud. The outer ends of the axles are supported in axle boxes which are so arranged as to allow oscillation of the axles, and the lever bearings of one pair of axles may be connected diagonally by a rod to those of the next pair of axles. By these arrangements the wheels are capable of self-adjustment to any curve or line of the rails, "as the axles are always brought into " radial lines with the centre of the curves," and there is thus no tendency to run off the rails, much wear and tear being also avoided.

These improvements may be applied to agricultural and traction engines in combination with any ordinary steering apparatus."

[Printed, 4d. No Drawings.]

A.D. 1864, October 31.—N° 2691. (\* \*)

DAVIES, GEORGE.—(*A communication from Pierre Grandjean, Léon Henon, Alphonse Colas, and Marcel Colas.*)—(*Provisional protection only.*)—"An improved method of and apparatus for " warming and cooling railway carriages." A special carriage for the apparatus is employed, "placed at the head of the train " between the tender and the luggage van." It consists of a furnace and casing which heats the air caught by two "wings" at the sides of the casing. It passes round passages surrounding the furnace, and is then distributed through a tube below the frame of each carriage. Branches from this tube convey the air to foot warmers and perforated tubes in the different compartments. The tubes are joined by a "coupling having a screw-thread " intended to receive " an india-rubber tube. The coupling at the last carriage has " a cover." The "wings" for catching the air introduce it " by a sort of tuyere, the orifice of which can be " regulated by the aid of a damper worked by a rack." The inlet of the air into each carriage is regulated by a valve and stop-cock in the tube. In summer, a refrigerating apparatus can be substituted for the furnace.

[Printed, 4d. No Drawings.]

A.D. 1864, November 1.—N° 2698.

GEDGE, WILLIAM EDWARD.—(*A communication from Jean Baptiste Legault.*)—(*Provisional protection only.*)—"An improved " axle."

The inventor proposes in this case to place "on that part of an axle subject to wear," and on each side thereof, a nut or convex projection in the form of a wheel, about three parts of an inch in thickness or breadth, there being on the outer periphery of this height, and an inch or two inches in convex projection, "the half of a concavity absolutely of the same dimensions" in its interior as the projection," this being fixed firmly by its two ends to a second axle, connected to the springs or the side framing of the carriage, the lower half of the projection on the moveable axle being placed on the other half of the concavity. The inventor states that by this means he diminishes, by at least a third, the length of the rubbing surface of the axle in the axle box, and fixes in the most secure manner the carriage to the moveable axle, without danger from lateral or other shocks. To facilitate the lubrication of this moveable axle there is made on or in the upper concave part a small opening communicating with the upper convex part, in such manner that the lubrication is easily effected.

The arrangements mentioned above are set forth as being "peculiarly applicable to carriages when the roads are straight or slightly curved," the system being rendered applicable to "all roads whatever" by an arrangement which permits the wheel on the inside of the curve to "unscrew" itself from the axle, "and either to remain still, or better, to turn slowly while the opposite wheel advances," resuming its course when the curve has been passed; "the screwing and unscrewing taking place without mechanical assistance."

This improved axle "may be applied to railway vehicles as well as to those running on ordinary roads."

[Printed, 4d. No Drawings.]

A.D. 1864, November 1.—N<sup>o</sup> 2701.

RICE, WILLIAMS.—"Improvements in applying the wheels and axles of railway and other carriages."

In describing this invention the patentee states that it has generally been the practice "to fix or key the wheels of railway carriages to the axles, so that the wheels and axles revolve together," but that "in some cases the wheels of such carriages have been arranged to turn on their axles whilst the axles are fixed or retained from rotating." He then states that accord-



ing to this invention "the wheels are not only free to turn on their axles, but the axles themselves are free to turn also. The ends of the axles, as heretofore, are received into bearings such as are now employed, and are lubricated as heretofore, and the centres of the bosses or naves of the wheels are suitably formed to turn freely on the axles, they not being keyed thereon. The parts of the axles on which the wheels are received and the interior of the naves are, as is well understood, prepared and fitted accordingly, and they are lubricated either from the same boxes as the other parts of the axles, or separate provision is made for lubricating those parts."

In order that the interior of the nave or boss of a wheel may at all times fit the axle certain wedge-formed pieces are used, which enter recesses in the nave or boss, and are adjustable by means of screws or other mechanical arrangements.

[Printed, 10d. Drawing.]

A.D. 1864, November 2.—N<sup>o</sup> 2708.

FURNEVALL, JOHN, and KEIGHLEY, GEORGE. —(*Provisional protection only.*)—"An improved mode of combining railway wheels and axles."

This invention consists in keying one of the wheels to the axle, and allowing the other to run loose thereon between two shoulders, one of which may be forged with the axle or shrunk thereon, and the other secured thereon by a screw or in any other convenient manner; or both the shoulders may be secured by screw nuts, or otherwise. By these arrangements "the friction caused in going round curves is avoided, and the strain on the axle, owing to the unequal wearing away of the tires, is also prevented."

[Printed, 4d. No Drawings.]

A.D. 1864, November 3.—N<sup>o</sup> 2724.

ROWE, JOSEPH GRINDLEY.—(*Provisional protection only.*)—"Improved safety apparatus applicable to railway trains."

The object of this invention is to enable the guard of a railway train to communicate with the engine driver through the agency of compressed air, as also to apply break apparatus "with increased force through the same agency, or through the agency of any liquid not liable to freeze." And the invention "consists prin-

“cipally in improved apparatus for utilizing the rotary motion and power of the running wheels of the guard’s van to force air or liquid substances into a receiver or reservoir, so as to be available either for the purpose of sounding a whistle, trumpet, or other pneumatic signal apparatus, sufficiently loud to be heard by the driver, or applying the break apparatus; and also a dusting box to the wheels or metals.”

The inventor mentions that the “peculiar features” of the invention are, firstly, an arrangement of apparatus by which great propelling power is obtained from an eccentric and a lever working in combination therewith, “and capable of being thrown in and out of gear without risk or danger;” secondly, providing a receiver or reservoir with a plunger capable of maintaining or increasing the pressure of the air or liquid contained therein when applied to the purposes of this invention; and, thirdly, in the application and addition of a dusting box to the “rolling stock” of railways, such box being partially filled with pounded resin, sand, or other equivalents, and such box being, either by the action of the break apparatus or by a separate contrivance, lowered to and made to traverse the metals or wheels, depositing upon the same as it revolves, through holes provided for the purpose, particles of the matter contained therein.

[Printed, 4d. No Drawings.]

A.D. 1864, November 7.—N° 2753.

SIMPSON, GEORGE.—“Certain improvements in mechanism or apparatus for preventing accidents on railways.”

This invention consists “in the novel employment and use of sliding shafts or rods attached to each carriage, and held or supported in brackets secured to the carriage from above the axles, and on a line with the coupling links; such rod projects beyond the end of the carriage to which it is attached, and terminates in buffers or discs which are in contact when the carriages are coupled, thereby forming one continuous connection throughout the whole length of the train. On the brackets secured to the framework of each carriage projections or shoulders are placed, having fixed collars bedding against them, and placed at equal distances from the ends of each shaft, which hold sliding collars that are kept apart by a spring coiled around the central portion of the shaft, about half-way

“ between the discs or buffers. Thus, when any undue or irregular  
 “ pressure is exerted upon one end of the shaft (or shafts), the  
 “ said projections or shoulders fixed to the said brackets act  
 “ upon the collars and springs, and thereby transfer the force of  
 “ the concussion (through the rods and buffers) to all the springs  
 “ throughout the train,” the force or shock of the collision  
 thereby becoming “ distributed, and consequently diminished.”

The patentee sets forth the “ chief feature ” of the invention as  
 being “ the continuation of the buffer shafts in combination with  
 “ helical or coiled springs.”

[ Printed, 8d. Drawing. ]

A.D. 1864, November 8.—N<sup>o</sup> 2764.

ADAMS, WILLIAM BRIDGES.—“ Improvements in locomotive  
 “ engines and trains, for the purpose of diminishing wear and  
 “ risk on railways, tramways, and common roads.”

This invention is described at some length, and under different  
 modifications. The essential features of the invention consist:—

Firstly, in a certain “ frame arrangement for enabling wheels  
 “ of railway carriages or wagons to turn on a centre, so as  
 “ to place their axles true to curves or straight lines, guided by  
 “ the traction rod or otherwise, with a central pivot to turn the  
 “ frame on, or with curved guides attached to the body for the  
 “ axle boxes to play against in a curved line fore and aft.”

Secondly, in an arrangement of brakes “ attached to these  
 “ frames, and following the curved movement of the wheels,  
 “ being self-acting by means of weighted levers, so that they will  
 “ always press on the wheels unless lifted, either by the traction  
 “ rod, by a chain over pulleys working fore and aft either way,  
 “ or lifted by hand or steam, by guard or driver, or by counter-  
 “ balance weights,” these brakes being also applicable to other  
 carriages.

Thirdly, in an “ arrangement of long carriages or others on six  
 “ or more wheels, which may be built in lengths and joined  
 “ together so as to be of facile transit in parts, the centre  
 “ wheels being fixed as usual in horn plates, and the end wheels  
 “ provided with curved beds to their axles between the wheels,  
 “ such curved beds sliding between curved plates fore and aft  
 “ attached to the frame, which serve to keep the axles true on  
 “ curves and straight lines, free movement being allowed by

" the springs, which may be swivelling, or fixed on the axle  
 " boxes, and carry the body by long swinging shackles with  
 " ball-and-socket joints, the supporting timbers strengthening  
 " the body and frame, and serving as sledges in case of the  
 " vehicle getting off the line," self-acting brakes being also  
 " carried by the curved beds of the axles following the wheels."  
 This part of the invention includes the application of similar  
 springs and curved axle beds to " locomotive engines on eight or  
 " nine wheels, either with or without friction wheels to give  
 " movement and guidance," one arrangement being described  
 which " dispenses with scrolls or timber bearings," the springs  
 used in this arrangement being also applicable to road carriages.

The invention also includes an arrangement of the boilers of  
 locomotive engines which will enable them to retain water, " at  
 " various levels, like canal locks, when ascending or descending  
 " inclines."

[Printed, 1s. Drawing.]

A.D. 1864, November 14.—N° 2837.

HART, JOHN MATTHIAS, and PURKIS, ROBERT.—(*Pro-  
 visional protection only.*)—" Improvements in means or apparatus  
 " for lubricating railway carriage and other axles and bearings or  
 " rubbing surfaces."

The object of this invention is to effect the supply of lubricating  
 matter from a suitable reservoir to the axles and bearings or other  
 surfaces to be lubricated, in regulated quantities capable of varia-  
 tion to the speed of such surfaces or otherwise. " For this pur-  
 " pose a reservoir of the lubricating matter is provided with a  
 " shaft, having hollow arms corresponding in number with the  
 " number of separate parts to be lubricated. Each of these arms  
 " is by preference formed with a pair of cups or spoons turned in  
 " opposite directions, so that in whatever way the arms are for  
 " the time turning one of each pair of cups or spoons will yet  
 " take up fluid, which in their rotation is conducted through the  
 " arms towards the centre, and it is there dropped into a separate  
 " receiver in connection with separate channels to convey the  
 " fluid to the respective parts to be lubricated." In place of  
 hollow arms other conduits may be formed to convey the  
 lubricating matter from the cups or spoons. In the case of a  
 railway carriage, motion may be given to the revolving shaft

carrying the cups or spoons "by suitable gear from the axle of  
 " a screw or screws, or of a fan or fans placed in a channel or  
 " channels to receive a current of air in either direction, according  
 " to the direction in which the carriage may for the time be travel-  
 " ling; the rate of delivery will vary with the speed of the car-  
 " riage, or as in the case of other machinery the rotary motion  
 " may be obtained by a band or otherwise from one of the axles,  
 " or by clockwork; or other motive power may be employed for  
 " the purpose."

" The stem of a float or glass tube may indicate the height of  
 " the fluid in the reservoir, and the supply to such reservoirs may  
 " be through a passage capable of being closed by a float when it  
 " is sufficiently filled."

[Printed, 4d. No Drawings.]

A.D. 1864, November 14.—N° 2841.

VICKERS, THOMAS EDWARD.—"Improvements in the manu-  
 " facture of steel castings."

This invention relates more particularly to casting heavy masses  
 of steel, such as wheel tires, gun blocks, crank axles, and other  
 masses.

The object of the invention is to prevent the formation of large  
 crystals while the metal is cooling, this being effected by keeping  
 the moulds in which the casting is formed in motion so long as  
 the metal continues in a molten or liquid state. The patentee  
 states that he does not confine himself to "any particular motion,"  
 but that he prefers "an oscillating, reciprocating, or rocking  
 " motion, whereby the liquid metal will be agitated or moved in  
 " the mould. When the article to be cast is circular, such as  
 " railway wheels or tires, an oscillating or rocking movement of  
 " the mould will be found sufficient to set the molten metal in  
 " motion, and thereby prevent the formation of large crystals.  
 " For some articles an intermittent circular motion will be pre-  
 " ferable, while for others a reciprocating movement will answer  
 " the purpose. Other motions or compound movements may be  
 " advantageously employed in some instances." The "particular  
 " motion" to be used for the purpose of the invention "must be  
 " left to the discretion of the manufacturer," such motion being  
 continued "until the metal is quite set."

[Printed, 8d. Drawing.]

A.D. 1864, November 14.—N° 2843.

BAILLY, NICOLAS, DURAND, CHARLES, MESNARD, GEORGE HOWARD, and POIRIER, ZACHARIE. — “Improvements in the application of rolling friction to the axle-boxes and journals of running shafts and axletrees of machines and vehicles of all descriptions for lessening the resistance to the motion.”

This invention relates to improvements upon the invention for which a Patent was granted to the above-named Nicolas Bailly and Charles Durand on the 3rd of September, 1863, No. 2,177, and consists, “where the bearings are circular in form,” in the application of “a cylinder running freely upon the axle or shaft, or on a lining fixed thereto, supported on spheres, which spheres or other equivalent supports enter or work upon a throat or shoulder formed on the lining, shaft, or axle,” the ends of the cylinder being “cut away in a dished and coned form to receive the spheres in suitable openings or embrasures.” Where the bearings are not circular in form, “the application may in some cases be made to consist of a kind of turntable beneath the shaft, formed by a basin in the bearing, and by a circular coned and dished piece turning freely on a pivot, cut away in a curved form on its outer edge to receive spheres, 3, 4, or more in number, upon which the turntable piece rotates, the spheres entering a throat on the under side thereof; on the upper surface it is in contact with and supports the shaft or axle, which also rests upon a sphere running within the upper surface of the turntable, and entering a throat in the shaft or axle, and guided by a friction roller, which is supported by chairs in the axle box,” these chairs sustaining two or more large friction rollers, which are above the shaft or axle, there being “4 tapered and screwed keys to firmly adjust and fix the same.” The patentees mention, however, that as this last arrangement would only be a modification of one of the arrangements described in the former Patent of Messrs. Bailly and Durand, no claim is here made for it.

The invention is mentioned as being applicable both to railway and common road carriages, and is described under various modifications, the working spheres being made “to turn about in every sense,” and each sphere having “always a tendency to wear itself true.”

[Printed, 8d. Drawing.]



A.D. 1864, December 2.—N° 3006.

CLARK, WILLIAM.—(*A communication from François Ferdinand Auguste Achard.*)—"Improvements in the means and apparatus employed for actuating railway brakes."

This invention relates to "an improved electric apparatus, applicable for working the brakes and signalling on railways, which result is obtained by the action of a pile acting automatically or otherwise on suitable gearing, which in its turn regulates the mechanism employed for producing the effect desired." Instead of a "pile," any suitable generator of electricity may be used, "such as an induction apparatus," and the arrangements are such that the brakes may either be worked from the locomotive of a train or from any of the carriages of a train, and also be called into requisition by the guard or other attendant of a train when necessary, various arrangements being described as applicable for the purposes of the invention, these including a "method of applying the brakes," "locking the wheels with continuous pressure," and a means of "communicating between the front and rear of a train," as likewise the stoppage of a train on the occasion of a coupling breaking, or one part of the train being disengaged from another.

Although the invention is set forth as consisting of the application of electric apparatus in actuating railway brakes, the arrangements described are equally applicable to apparatus which may be worked by hand, various modifications of the invention being described.

[Printed, 1s. 10d. Drawings.]

A.D. 1864, December 5.—N° 3024.

SHAW, RICHARD.—(*Provisional protection only.*)—"Improved arrangements for locking and unlocking the doors of railway carriages."

This invention relates to various modes of locking and unlocking railway carriage doors, "and may be applied so as to lock or unlock all simultaneously, or to lock one side while it unlocks the other or opposite side."

In one arrangement there is placed below or in the floor of the carriage "at each side, a shaft running the length of the carriage (and lying in bearings)," and having thereon cams, cranks, or eccentrics, "placed so as to work a rod, rods, or other connection communicating with the lock, catch, or fastening of

"each door," this being done by means of an upright rod, chain, or other connection. The shafts, cams, cranks, or eccentrics are worked or moved by a handle or lever attached to such shafts, and the two shafts may be worked separately or together by means of a bar, rod, or chain, as most desirable.

Another arrangement is mentioned in which the shafts are made "to slide by a wheel and pinion, worm wheel, or lever," an upright bar or connecting rod acting as a spring for the lock, catch, or fasteners to the shaft, a lever being placed in each door, which is capable of being moved by a handle.

In another arrangement the upright bar acts as the lock; and in other cases wire ropes or chains are employed to act as substitutes for the shafts when the doors of both sides of the carriage are to be acted upon simultaneously.

[Printed, 4d. No Drawings.]

A.D. 1864, December 9.—N° 3064.

JOHNSON, JOHN HENRY.—(*A communication from Reuben Trumbull Monroe Wells.*)—(*Provisional protection only.*)—"Improvements in apparatus for facilitating the starting of railway "and other carriages and waggons."

According to this invention a ratchet wheel is secured to the centre of one of the axles of a carriage, such wheel being "enclosed in a hollow pulley, provided with long bosses and "turning loosely upon the axle," a pall being placed inside this pulley, and such pall, when released and the pulley turned, engaging with the teeth of the ratchet wheel, and causing the axle to rotate. A chain is passed round the pulley and secured thereto at one end, the other end thereof being attached to a short cross draught bar, the ends of the latter having connected thereto chains, "leading to a tapered metal slide fitted in a guide "in one or both ends of the carriage. It is to this tapered metal "slide that the draught chain is attached." On each side of the chain pulley there is fixed a stationary cam, and upon these rests a pin which passes through the pall, the cams holding the pall out of contact with the ratchet wheel until the pulley is so turned as to cause the pin to leave such cams, a coiled spring or a weight being used to turn the pulley in the reverse direction, "and setting "the apparatus again when the strain of the draught chain "ceases." In order to prevent the cams or eccentrics from

revolving, they have each a projecting button on one side which enters between forked brackets secured to the framing. "On the hauling power being applied it is transferred to the chain pulley, causing it to revolve in the same direction as the running wheels for a certain distance, when the pull being relieved from the cams it drops into the teeth of the ratchet wheel, and as this wheel is firmly secured to the axle it is rotated with an increased power, due to the leverage of the radius of the drum. On the chain being drawn fully out the draught bar comes against a fixed stop in the under framing, and the carriage then moves under the ordinary conditions." In case of a breakage of the chains the sudden reaction of the pulley consequent upon the release of the coiled spring is prevented by means of stops placed in the peripheries of the cams or eccentrics.

In applying this invention to railway carriages, "the tapered slide in the rear end of each carriage, except the last one, should be prevented from being drawn out, as, if not, the pull of the rear apparatus would be engaged in the ratchet, and thereby prevent the car from moving in the direction of the power applied."

[Printed, 4d. No Drawings.]

A.D. 1864, December 9.—No 3066.

**ROBERTS, THOMAS HUMPHREY.**—"Improvements in apparatus for retarding and stopping carriages."

This invention is applicable both to carriages for common roads and to those for railways. As applied to an omnibus or other carriage having a pole and locking apparatus, a bar is arranged in front of the fore wheels, such bar being fixed to the back end of the pole, so that it may be moved outwards for a short distance with the pole when the horses are drawing. At the ends of this bar the outer traces of the horses are attached, by which the ends of the bar will be drawn away from the fore wheels. Near the ends of the bar, and at the back surface thereof, two breaks or friction blocks are affixed, one to break each of the fore wheels. The ends of the inner traces are fixed in the usual manner. "Hence it will be understood that when the horses are drawing a carriage the breaks will be away from the wheels, but immediately the speed of the horses is reduced, whether on a level road or going down hill, the fore wheels of the

" carriage will come against the breaks, and will thereby be retarded from turning. In a similar manner may apparatus be applied to two or four wheeled carriages when shafts are used." Different modifications of the invention are described, in some cases the power of the breaks being increased by the addition of " cups," which are so arranged as to be pressed upon the naves of the wheels simultaneously with the action of the breaks upon the wheels. And in order to prevent the break bar from being pulled forward with a jerk by the horses when the vehicle is started, springs are interposed between the bar and the front axle, such springs aiding in pressing the breaks upon the wheels when requisite.

No description of the mode of applying the invention to railway carriages is given in the Final Specification, but according to the Provisional Specification the apparatus is in that case " combined with the buffers in such manner that when the speed of the locomotive engine is reduced, the breaks of each carriage will be caused to act on the wheels by the momentum of the carriage."

[Printed, 1s. Drawings.]

A.D. 1864, December 10.—N° 3067.

HOLLY, JOHN. — (*Provisional protection only.*)—" Improved mechanical arrangements or appliances for enabling the guard of a railway train to keep all the carriage doors closed until the train is brought to a standstill, and then disengage them all at once."

This invention consists in adapting to the under framing of each carriage, and at both sides thereof, a long stout wrought-iron rod, supported by bearings which enable the rod to be moved sideways therein. On each rod, below the door of the carriage, is a short lever arm, having a slot therein, to which is connected a bolt by a pin, the bolt passing upwards through a hole in the floor of the carriage, and there being a corresponding hole in the lower edge of the carriage door, so that when the door is closed, and the rod turned partially round, the lever arm pushes up the bolt into the hole in the carriage door, thus preventing it from being opened until the rod is turned back and the bolt lowered. The rods of the different carriages of a train are connected together by means of pins passed through coupling pieces formed

with universal joints, so that the guard of the train, by turning the rods, may fasten and unfasten all the carriage doors of a train simultaneously by means of a weighted lever in his carriage: accidents from the accidental or improper opening of the doors being thus prevented.

[Printed, 4d. No Drawings.]

A.D. 1864, December 12.—N<sup>o</sup> 3074.

WOOD, THOMAS.—(*Provisional protection only.*)—"Improvements in means or apparatus for communicating and signalling on railway trains, and for securing the doors of the carriages."

This invention consists, firstly, in placing in the partitions of railway carriages small shutters or windows, "so arranged that by simply moving or turning them sufficient noise will be made to attract the attention of passengers in the next compartment." Such shutters or windows may be constructed, for example, of sheet iron or other metal, and hollow, a quantity of shot being placed therein, which, on the movement of the shutter, "would roll or fall noisily from one side to the other, and so be a signal to passengers in the next compartment that their attention was desired;" and "if no communication followed, then they could look through."

Secondly, in providing signals suitable for either day or night, which may be worked by means of "handles or pulls" placed in the compartments of the carriages, and connected to arms or levers, by means of which the signals may be thrown into such a position as to be easily distinguishable by the guard, whose attention may be moreover called thereto by the sounding of a bell or gong close to him, suitable wires, chains, or their equivalents passing from carriage to carriage, and connecting the handles or pulls together. Lamps made of glass of different colours, or partly opaque, may be used as signals.

The handles or pulls which are employed to communicate and signal, or handles provided for the purpose, may be made to operate also upon bolts or fasteners, and push them into recesses in the doors of the different compartments of the carriages, the arrangement being such that such bolts or fasteners are then held by springs or catches, and can only be released by the guard. And in order to prevent a passenger, should the door of a com-

partment be got or become unfastened, from opening the door or leaving the train without detection, a lever or tappet is so arranged in connection with each door that in such case a gong, bell, or other apparatus will be sounded, and thereby the attention of the guard attracted thereto.

[Printed, 4d. No Drawings.]

A.D. 1864, December 13.—N° 3083.

KENDALL, CHARLES.—“Improvements in atmospheric railway “ breaks and communications.”

According to this invention each carriage of a railway train has underneath the body a cylinder, in which are two pistons furnished with short rods and cross heads, rods connected to the latter passing thence to break apparatus of the ordinary character, and the arrangement being such that on the pistons being pressed asunder or towards the ends of the cylinder the breaks are applied to the wheels of the carriages, while when the pistons are moved towards each other they are withdrawn from such wheels. The pressing asunder of the pistons is effected by the introduction of condensed air between them, springs serving to return them to their places and release the breaks. The condensed air is supplied from a reservoir carried by the guard's van, into which it is compressed by an air pump, the piston of which is worked by a crank in connection with a pulley which is driven by a strap proceeding from another pulley fixed upon one of the axles of the van; a small cylinder, provided with a plunger, and communicating with a larger cylinder also furnished with a plunger or piston, the rod of which carries a strap guide, serving to regulate the condensation of the air into the reservoir, moving the strap from a fast to a loose pulley, and so stopping the air pump when the reservoir is sufficiently supplied, and replacing the strap upon the fast pulley when the supply diminishes. Suitable pipes proceed from the reservoir to the cylinders under the different carriages, such pipes being furnished with suitable cocks, and the whole being under the control of the guard, in whose van is suitable apparatus for causing the condensed air to apply the breaks when necessary, and to discharge such air from the cylinder when the breaks are no longer required to act.

The details of the invention are described at some length, and include certain arrangements of rack quadrants, catches, and other



apparatus for causing the break blocks to adjust themselves to the wheels as they become worn. Also flexible tubing for connecting the apparatus of one carriage with that of another, along with a certain "self-acting two-way cock," the arrangement of which is such that should a carriage become disconnected from the rest of the train the cock will close the pipe at the end of the last remaining carriage of the train, and so prevent the escape of air from the reservoir. The condensed air from the latter may also be employed to sound whistles, either by the guard or by the passengers of any carriage who may require his attention in case of outrage or otherwise.

[Printed, 1s. Drawing.]

A.D. 1864, December 17.—N<sup>o</sup> 3128.

SALMON, PETER.—(*Provisional protection not allowed.*)—"Improvements in the rolling stock of railways, and traction engines and carriages for common roads."

One part of this invention consists in constructing railway carriages "partly of iron and partly of steel," with suitable spaces for the reception of steam generators or expanders, and other apparatus connected with the propulsion of such carriages, and also an "electoral embrage," being "an apparatus which communicates with all the breaks of the carriages in a train, worked "by electricity, springs, and rack wheel," this rack wheel being described as "a magnate under the control of the engine driver "or other official," with an electoral insulator in the shape of a small lever, tightening or slackening all the breaks at once, an "electoral wire" being mentioned, which is apparently meant to pass the whole length of the train, such wire, in the event of couplings breaking, or a part of the train running off the line, becoming disconnected or broken, and causing the breaks to stop the train, "the breaks being all self-acting by springs or cylindrical steam cushions, and taken out of gear and sustained there "by the embrage." The carriages are also provided with gangways, passing along the sides or down the middle of such carriages. Carriages are also mentioned as having two or three floors, the level of the first or under floor being only a few inches above the level of the way, and being furnished with sleeping and other accommodation, stairs leading from the lower to the upper floor, and the latter being arranged, if desirable, as a

promenade. In snowy weather a projecting bow or stem is fixed to the first carriage to clear the way, and in "summer weather" the roof of the upper floor is composed "of iron, wood, or glass, " to coil up at the sides or top on revolving spindles." Wheels are described as being made "solid or armed, of cast steel," each wheel having "a flange for each side of the rails," and working "singly with hollow steel or solid axles," oscillating "in their " frame or fixing, and bearing up the carriage with vertical " circular steel springs or india-rubber washers," the sides of the carriage overhanging the wheels.

Wheels suitable for carriages for common roads are mentioned as being composed of wood, iron, or steel, either solid or armed, and with oscillating axles, as mentioned above, the tyres of the wheels being clothed with pieces of wood "at set distances;" these carriages being also formed with an upper and a lower story, and driven by steam, several carriages being connected together, if desirable. Such carriages are provided with steering apparatus, and other suitable adjuncts, and for the convenience of passengers alighting from these or from railway carriages a "stepping carriage" is used, which consists of "a platform on two pair of wheels, with " upright handrails." Such a platform may be made to travel with railway and other vehicles, and serve to enable persons to alight therefrom without the vehicles stopping, being disengaged from such vehicles when a person has stepped upon it, and coming gradually to a stand. Another part of the invention consists in altering the seats and backs of all classes of railway and other carriages "from the horizontal and vertical to angular lines, which " allows the travellers' heads and upper part of the chest to " incline backwards when in a sitting position."

The invention is described at some length, and includes various particulars relating to propulsion, signals, and other matters, none of which, however, require notice here.

[Printed, 4*l*. No Drawings.]

A.D. 1864, December 17.—N° 3137. (\* \*)

EASTMAN, ZEBINA. — "Improvements in rails or trams for " streets and other roads or ways, in wheels to run thereon, " and in the working parts of carriages or waggons to be used " therewith."

The first part of this invention consists in constructing rails with grooves in the upper surfaces of "concave" or "cupped" form, the rail forming in effect a portion of a hollow cylinder of small diameter. A rib or flange is formed along the lower portion of the rail, which maintains it in position when inserted into the ground, the rail being sunk therein so as to bring the upper edges thereof level with the surface of such ground, and the two lines of rails being connected together by cross bars or ties, or in some other suitable manner. If desirable, however, the rails may be laid upon wooden sleepers, in which case the rib or flange is not required. And a railway may be formed either by using two lines of these concave rails, or one line of such rails and one line of broad flat rails, this latter arrangement enabling carriages of different widths to travel on the railway, the wheels on one side of such carriages travelling in the hollow of the grooved rail, and those on the other side on some portion or other of the broad flat rail.

The second part of the invention consists in constructing the wheels of carriages with convex rims, so as to adapt them for travelling upon the concave rails already mentioned, these rims being of such dimensions as to "move somewhat loosely" in the grooves of the rails, and so "give the wheels play."

Another part of the invention consists in so constructing and arranging the axletrees of vehicles having four or more wheels that they will readily adapt themselves to passing round curves. In the case of four wheels the axles have each in the centre a circular rim or bed piece on which the body of the vehicle rests, allowing the axles to turn freely, a horizontal bar passing from the centre of one axle to the centre of the other, and the axles being connected thereto by pivots. A connecting rod passes diagonally from a projection on one side of the rim or bed piece of one axle to a similar projection on the contrary side of the rim or bed piece of the other, and, the wheels being loose on the axles, the effect of the whole arrangement is, that in passing round a curve this diagonal rod causes the axles and wheels to assume positions corresponding therewith. In the case of a vehicle with six wheels the several axles are not connected by diagonal rods, but are provided with toothed segments, in gear with each other, and which, when the vehicle is passing round a curve, cause the axles to assume the requisite positions.

[Printed, 10d. Drawing.]

A.D. 1864, December 17.—N<sup>o</sup> 3138.

HOWES, WALTER, and BURLEY, WILLIAM.—(*Provisional protection only.*)—"Improvements in lamps for railway and other carriages, and in connecting lamps to carriages; a part of which improvements may also be applied to handles for carriages."

This invention consists, in the first place, in attaching to the door of a railway or other carriage lamp a spring handle, a catch being attached to the lamp, with which, when the lamp door is closed, the spring handle engages. The tongue of the spring handle is connected to the axis of the handle by means of a screw, in a manner similar to that by which the inside handles of carriages are connected to their spindles, the head of the screw being covered by a cap, which cap "screws on the end of the axis," and protects and conceals the screw by which the tongue is fixed to the axis of the handle. Such a screw cap may also be applied to the "inside handles" of carriages with a similar effect.

The free end of the arm by which the lamp is attached to the carriage is made "somewhat in the form of a hook," and in the side of the lamp is a recess or socket into which the hooked end of the arm fits, certain semi-tubular pieces of brass or iron aiding to form the connection, and an annular ring being screwed over the two so as to form a complete joint, the ring being furnished with "thumb bits or projections" which facilitate the screwing or unscrewing of such ring.

[Printed, 4d. No Drawings.]

A.D. 1864, December 21.—N<sup>o</sup> 3174.

REID, WILLIAM.—"Improvements in the arrangement and construction of wagons or vehicles for the conveyance of cattle upon railways."

This invention relates to "a peculiar arrangement and construction of cattle wagons or trucks to be used on railways, whereby provision is afforded for keeping the cattle supplied with water during the course of a journey, the result being that the cattle, in place of being out of condition at the end of their journey, as is now the case, are perfectly fresh, and ready for immediate sale."

In carrying out the invention "it is proposed to construct these improved wagons with water troughs, such troughs having by

" preference an opening on the outer side for the convenience of  
 " filling the same from the hydraunts on the line of railway, the  
 " troughs forming a part of the wagon itself, or being capable of  
 " removal therefrom for cleaning or repairs. When several  
 " troughs are used they are coupled together, so as to communi-  
 " cate with each other, the water being thus free to run from one  
 " to another."

The patentee states that in modifying existing cattle waggons so as to carry out the object of this invention, "special openings" are cut around them, and water troughs are inserted into such openings, and secured therein in any convenient manner," while as regards new waggons the troughs may be arranged in any manner that may seem desirable.

[Printed, 1s. 3d. Drawings.]

A.D. 1864, December 24.—N° 3202.

LEAHY, EDMUND.—"Improvements in the construction and fitting of railway wheels."

This invention relates to "a novel mode of forming wrought-iron railway wheels, and of combining the same while being formed with their axles so that the various parts composing the wheel and axle will be permanently united or knit together, whereby not only may strong wrought iron-wheels be constructed in an economical manner, but the necessity for the operation of fitting wheels to their axles may be avoided." The patentee mentions, however, that in some cases he forms the wheels "with an independent boss," and keys them to their axles in the usual manner. The tyre of the wheel is made in any ordinary approved manner, with an inner flange or rib of wrought iron. The spokes are formed of wrought bar iron, split at the ends, and also notched or slotted transversely, a collar filling the transverse notches in the inner ends of the spokes.

Different modifications of the invention are described, in one arrangement the boss of the wheel, or it may be the axle, being provided with two collars to receive the spokes, the tyre having in some cases one rib only, and in others more than one. The spokes of wheels may be also made tubular, but may be filled with metal in a fluid state, certain closing "discs" being used to secure the melted metal in its place in the spokes.

[Printed, 10d. Drawing.]

A.D. 1864, December 24.—N° 3211.

ROBERTSON, JAMES PETER.—“An improved connection applicable to bales used in cavalry stables and other purposes.”

This invention has for its object the connection of the ends of bales ordinarily used in cavalry stables for separating horses with the ropes or chains to which they are suspended, in such a manner as to admit of the connection between the bale and the rope or other means of suspension being readily broken and reformed as may be required. The end of the bale, instead of being directly fastened to the rope or other means of suspension in the ordinary manner is connected thereto by means of two separable links, which are united by a ring or hollow ball which covers the junction of such links. One of these links has a portion cut out of it diagonally at one end, the other link having a correlative portion cut out of it at the end which is to be fitted to the first, and there is also a tooth or projection formed on one link and a corresponding groove or cavity in the other, the two ends being so formed that when brought together they are conical, in order to admit of the ring being raised or slidden along, above, or off the junction thereof, and thereby allowing them to be disengaged in a lateral direction; “the covering and uniting ring will remain in its position by its own gravity, and keep the parts united until it is raised or moved along the cone formed by the two ends of the links. Each link has an eye at the opposite end to that at which the junction of the two links is formed, and the rope or other means of suspension of the bale is connected to the eye of the upper link, while the bale is connected to the end of the lower link by a short length of rope or chain, and the said eyes of the links are respectively connected to ropes, chains, or other means of suspension or connection when applied to other purposes. In some cases, when the connection is applied to other purposes, as for instance, to railway trains, the links may be used horizontally, and a spring or bar may, if necessary, be employed to keep the uniting ring in its position in order to cover the junction of the two links, and prevent their lateral displacement, as required. Any convenient mechanism may be employed for moving the ring or hollow ball, and thereby breaking the connection between the two links.”



These "connectors" may be used either vertically or horizontally.

[Printed, 8d. Drawing.]

A.D. 1864, December 29.—N° 3232.

MILLAR, JAMES.—"Improvements in locomotive steam engines, and in part applicable to other engines."

The object of one part of this invention is to "distribute the weight of the locomotive in such a way that a larger portion of it bears upon the driving wheels, the axle of which is situated immediately forward of the fire-box, according to a common arrangement. The steam cylinders are placed forward of, but as near as possible to, the driving wheels, their piston rods working out at their front or back ends, and acting on the crank pins through return connecting rods. There may be two cylinders on each side, with the connecting rod in each case working between them, or there may be one cylinder only on each side with double forked or curved connecting rods."

"By these arrangements the weight of the cylinders and of the parts immediately connected therewith is made to bear more on the driving wheels, instead of bearing almost entirely on the leading wheels as in ordinary arrangements," the improved arrangements also possessing "the advantage of a long connecting rod."

Another part of the invention consists "in arranging the connections between the valve-motion link and the valve rod so that any play or looseness from wear may be made up with facility," certain blocks and swivelling pieces being employed in carrying out this part of the invention, which may be variously modified.

Another improvement in locomotive engines consists in applying "vertical brasses" in addition to the ordinary bearings of the axles of the driving wheels, "to receive the horizontal backward and forward thrust of the connecting rods," such brasses being set up by means of wedges which are inserted between them, and certain guards rivetted to the framework.

Another part of the invention consists in providing locomotive engines with rotating or other brushes or scrapers for cleaning the rails. When rotating brushes are used their axes may be so

arranged as to remove matters from the rails "sideways rather than longitudinally," and a modification of this part of the invention is described in which a brush rotates on a spindle which is carried by a lever frame fixed to a rocking shaft, the brush being provided with a frictional bevil wheel or rim which is in contact with, and is driven by, a similar wheel or rim, which receives motion from one of the leading wheels of the engine; the brush revolving in contact with a scraper, by which it is kept clean.

[Printed, 10d. Drawing.]

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1865.

A.D. 1865, January 2.—N° 6.

SMITH, JOSEPH, junior, and WILLIAMSON, JOHN.—"An improved method of and apparatus for lubricating the axles or journals of coal or ironstone waggons, or tubs, or of other carriages or rolleys used upon tramways or railways for carrying mineral or other material."

This invention consists in lubricating the axles of waggons or similar vehicles working upon tramways or railways by automatic means. At any convenient point of the tramway or railway, or at more points than one if required, the patentees place a pair or pairs of lubricating wheels, mounted upon suitable axles or journals. "These lubricating wheels are partly sunk below the ground, and must be of such diameter and be placed just so far within the rails" "that the upper part of their peripheries shall come in contact with the axles or journals of the running wheels of the waggons, tubs, rolleys, or carriages as they pass along the tramway or railway, and the axles or journals of the lubricating wheels are carried on bearings supported by springs, or by weighted levers, so as to let them give way slightly as the waggons or other vehicles pass." These wheels are covered with india-rubber, felt, or other suitable material, or, if found necessary, may be used without any covering and furnished with recesses or grooves, "and the lower part of their periphery dips into suitable lubricating material contained in a box or receptacle in which they revolve, and which is placed beneath the

" surface of the ground." The lubricating wheels may be so depressed by levers, however, as not to come into contact with the axles if desired.

[Printed, 10d. Drawing.]

A.D. 1865, January 5.—N° 35.

WILSON, JAMES EDWARDS.—(*Provisional protection only*).—"Improvements in locomotive engines, and in the springs of railway carriages."

According to one part of this invention a locomotive engine is provided with four pairs of wheels, "each with an outside crank pin, which are coupled together and also to two crank pins on cranks at the end of a central crank shaft, which is driven by two steam engines situated between the side framings. In order that locomotive engines may, notwithstanding their length, pass freely round curves, the forward and hinder axle boxes have a short play between their horns, so that the forward and hinder axle can move endways with their boxes a short distance. In coupling the wheels together the crank pins or journals for the coupling rods are made spherical, in order to allow for the endway motion of the axles when passing round a curve; a slight play is also allowed between the cranks on the driving shaft and the connecting rods."

In constructing springs for railway carriages, "in order to render them more suitable for varying loads, flat straight bars, by preference of tempered steel, are used, and they are so arranged that when there is a light load in the carriage only part of the elastic bars come into action, and consequently present the desired elasticity, more and more of the elastic bars coming into action to support the load as it becomes greater and greater." Between the bars, and near the ends thereof, are blocks, which keep the bars sufficiently asunder to allow for their play.

[Printed, 4d. No Drawings.]

A.D. 1865, January 11.—N° 95.

CHIDLEY, ROCK.—"Improvements in the construction of railway carriages."

The chief object of this invention is "so to construct railway carriages that when a number are brought together they will

“ form a saloon the whole length of the train of passenger carriages, and thus afford easy communication through the whole length of the train.”

An arrangement is described in which a carriage is constructed with the seats placed longitudinally, the outer lines of seats being arranged with the backs to the sides of the carriage, and the inner line or lines being about midway between them. Access is obtained to the carriage by means of doors in the sides, “ set in sufficiently far to form a lobby,” the doors being opposite to each other, and at one end of each carriage is a platform, which is hinged thereto, and projects therefrom into an opening formed in the end of the next carriage, in which it is capable of sliding to and fro in accordance with the action of the buffers, these platforms giving access from one carriage to another, openings in the ends of the carriages being provided so as to enable persons to pass upon the platforms. Above each platform is a frame carried by rods, which slide in other hollow screwed rods projecting from the end of one carriage and reaching to the next, these screwed rods being provided with “ tapped sockets,” which turn in bearings in the frame of the carriage, and are capable of being turned by means of chain wheels and a chain moved by a winch and pinion, so as to draw the rods inwards, a hood or covering of waterproof material being stretched over the frame, and the frame, moreover, being provided with springs, and so arranged that on the carriages approaching nearer to each other than usual the hood will partially collapse. The platform may, if desired, be composed of slats, connected together by flexible bands, these being supported by bars projecting from one carriage and capable of sliding in openings in the end of the next, or it may be composed of planking, mounted upon ledges projecting from the carriages, and provided with slots, which are passed upon coupling screws fixed in the ledges.

The invention also includes arrangements for warming and ventilating railway carriages, but these will be noticed in other series of Abridgments.

[Printed, 1s. 4d. Drawings.]

A.D. 1865, January 12.—No 101.

BARNES, FREDERIC, HANCOCK, DAVID, and COWPE, EDWARD.—“ Improvements in the method of and apparatus for applying electro-magnetism as a brake power to railway and other carriages and machines.”

According to this invention the magnets are placed by preference on the under side of the carriage and in a suitable frame. This frame is mounted on grooved wheels and capable of travelling within certain limits between rails or guides, and the magnets communicate by means of wires with a battery or batteries in the guard's van or on the engine. When the brakes are not required to act the magnets are somewhat withdrawn from the wheels of the carriage, and are so maintained by the spring or springs united at one end to the frame which carries them, and at the other to a bar fixed by preference at or near the central part of the under side of the carriage, but on the current being applied the magnets are caused to advance towards the wheels, carrying with them the frames, and, coming ultimately into contact with the wheels, stop the rotation thereof. When the wheels are not formed wholly of metal plates, the latter are applied to them. On the magnetic current being broken the frame containing the magnets is drawn back into its first position by the spring or springs. The arrangements may be such that the magnets may be applied simultaneously to a portion or to the whole of the wheels of the carriages of a train, the force of such application being regulated by the intensity of the current employed.

[Printed, &c. Drawing.]

A.D. 1865, January 20.—N° 177.

CLARK, WILLIAM.—(*A communication from Julien Eugène Cuvier.*)—"Improvements in apparatus for taking up and delivering mails and other parcels in railway trains while in motion."

According to one part of this invention, a parcel of dispatches, having been first corded, has passed through the cord a steel ring, which is capable of opening and closing, the ring being what is termed a split ring. On the platform from whence the dispatches are to be sent is a post carrying a bent rod and a double slide, the ring being placed in the latter, and there retained by a spring until the arrival of the train, when a bent arm projecting through an aperture in the carriage, which is to receive the parcel, enters the ring, and carries it and the parcel away from the slide, the ring sliding down the bent arm and depositing the parcel inside the carriage. The arm for receiving the parcel may be variously arranged.

In order to deliver parcels at a station from a carriage these arrangements are reversed, the carriage having fixed to it a double

slide and spring, in which a ring connected to the parcel is placed and retained, being removed therefrom by a bent arm fixed to a pillar upon the platform of the station, and sliding therefrom down the pillar.

These arrangements may be modified according to circumstances, in some cases a sheet-iron plate fixed to a rack being used to prevent the parcel from falling from the slide, and the bent arm mounted upon the pillar at the station being arranged to turn on an axis in case of its accidentally being struck by the train.

[Printed, 1s. Drawings.]

A.D. 1865, January 21.—N° 187.

ABEL, CHARLES DENTON.—(*A communication from Charles Louis Ferdinand Varailhon-Laflohe.*)—(*Provisional protection only.*)—"Improved apparatus for transmitting letter bags and " parcels to and from railway trains whilst in motion."

In this invention a cylindrical or otherwise shaped receptacle is used, which is divided vertically into two halves, each half being hinged to one of two rods projecting horizontally from a swivelling post fixed at the side of the line. This receptacle, when in operation, is in such a position that the carriages of a train will pass beneath it, and when not in operation the post is so turned that it does not project over the line. The two halves of the receptacle are so mounted that unless held together they swing on their hinges so as to open out at bottom, this opening out being accelerated by means of a spring, but they are so combined that one part cannot open unless the other does, and thus by means of a pawl or catch mounted upon the post which carries the receptacle, and which passes into a notch formed in the end surface of one part, both parts are kept closed. A parcel meant to be delivered to a passing train being placed in the receptacle, and the two parts closed, the receptacle is turned by moving the post so as to hang over the line, and on the train coming up a stud or pin projecting from the carriage into which it is meant to deliver the parcel strikes a tail piece projecting from the pawl or catch, the receptacle opens, and the parcel falls therefrom upon the top of the carriage, which is surrounded by a railing, the parcel then being removed therefrom by the officials. The falling out of the parcel (or mail bag, as the case may be) is facilitated by there being inclined planes inside the receptacle, upon which the parcel



rests while within it, and the opening of the receptacle may be facilitated by causing a stud on the railway carriage, after the pawl or catch has been moved, to strike a finger projecting from that part of the receptacle which opens in the direction of the motion of a train.

The delivery of a parcel from a passing carriage may be effected by arrangements the reverse of the above, the receptacle being mounted on the carriage, and being opened by a stud or pin mounted at the side of the way striking the tail of the pawl or catch, the parcel or bag then falling upon an inclined plane, from which it slides into a box placed to receive it.

[Printed, &c. No Drawings.]

A.D. 1865, February 6.—N° 321.

MARKHAM, CLEMENTS ROBERT.—(*A communication from William Graham Mcloor.*)—"A new method for removing or  
 "destroying the momentum of heavy bodies by means of an elastic  
 "machine or machines, so as to prevent injury and damage from  
 "concussion, applicable to ship cables, ship and fort armour,  
 "railway trains, tenders to pier heads and floating piers, gang-  
 "ways, breakwaters, and other similar structures; also as a  
 "motive power."

This invention consists essentially in the employment of a cylinder or drum, capable of revolving upon a fixed axle, and containing a number of coiled springs in the interior, these being secured at one end to the axle and at the other to the cylinder, and capable of acting, by means of chains or ropes, coiled round the drum, or by means of gearing connected with the axis thereof, upon mechanism suitable for various purposes, among which are mentioned controlling the speed of railway trains in descending inclines and aiding them in ascending other inclines, and the use of the invention as a means of actually propelling railway carriages and likewise carriages on common roads. In these cases the springs are contained in cylinders which operate through the medium of gearing in controlling the motion of or propelling the vehicles. Thus a train propelled by ordinary means, may, when descending an incline, have its speed reduced by bringing into gear with a wheel or wheels on one or more of the axles of the train other gearing connected to a barrel or barrels containing springs, and the latter being then wound up by the momentum of

the train, and retarding its motion by their resistance thereto; a change of gearing then enabling the wound up springs to aid the train in ascending the next incline by the force they exercise in unwinding. The springs thus serve the purpose of breaks when the train is descending an incline, and may also so serve when the train is approaching a station, being wound up by the momentum of the train after the steam has been shut off from the engine. Similar arrangements are described as being applicable to the propulsion of railway and other carriages, in some cases the drums and springs giving motion to the axles of the driving wheels through the medium of chains and chain wheels, and in order to prevent the speed of such carriages from becoming too great the action of the drums and springs may be controlled by means of suitable breaks.

The invention is set forth at very great length, and includes a number of details, comprising different arrangements of buffers and coupling apparatus, wheels with elastic tires, axle boxes fitted with "anti-friction wheel bearings," and other matters which will only be clearly understood with the aid of the drawings annexed to the Specification, many of these matters, moreover relating to the application of the invention to ships' cables and other objects not connected with the present series of abridgments,

[Printed, 2s. 8d. Drawings.]

A.D. 1865, February 11.—N<sup>o</sup> 393.

NEWBY, EDWIN HENRY.—(*Partly a communication from Anthony Leonard Fleury.*)—(*Provisional protection not allowed.*)—

"Improvements in case-hardening or converting partially into steel, articles of wrought or malleable iron."

The object of this invention is to carbonize and convert into steel portions of articles of wrought or malleable iron, leaving other portions uncarbonized, and to this end a protecting coating composed of oxide of iron mixed with lime, lime alone, clay, silicate of soda or potassa, borax, the oxides of tin, lead, and antimony, or other suitable protecting material is applied to those portions of such articles as are to be left uncarbonized, or in the condition of iron. Such articles are then placed in a close oven or furnace in which they are surrounded by heated carburetted hydrogen gas, which acts upon their uncoated portions in such manner as to carbonize them wholly, or to a suitable depth, and

thereby convert the said portions alone, or the surfaces thereof, into steel.

The invention is mentioned as being applicable to converting into steel the heads of wrought-iron railway bars, the faces of malleable iron wheels, the surfaces of shafts, axles, articles of cutlery, and other objects. The carbonizing furnace must have the atmosphere excluded therefrom during the carbonizing process, and to accelerate the process other gases may be used along with the carburetted hydrogen, such, for example, as cyanogen and ammonia, and by compressing the gases "their action will be intensified."

[Printed, &c. No Drawings.]

A.D. 1865, February 13.—N<sup>o</sup> 404.

ADAMS, WILLIAM.—"Improvements in bogie trucks used for supporting railway locomotive engines, carriages, and wag-gons."

In applying this invention to a bogie for the support of an engine, arrangements are made whereby the fixed or driving axles of the engine and the axles of the bogie truck "shall assume directions radial or nearly so to the curve round which the engine may be passing, and thus relieve the engine and bogie frame from lateral strain. In order to effect this object the centre pin attached to the engine is allowed to have lateral motion by working in a block or socket, which block or socket moves in a curved or straight slot placed at or near the centre of the bogie truck, and midway or nearly so between the axles. The traverse or play of the sliding block or socket is limited by stop pieces. The lateral motion of that end of the engine to which the bogie truck is attached may also be obtained by fixing the centre pin to the bogie truck instead of the engine frame, and providing a slot in the engine frame for the pin working in the guide block to slide on." The centre pin is bedded by preference on a spring; or the spring may be omitted; and horizontal springs may be provided to assist the engine to resume its central position with regard to the bogie truck on leaving curves.

The patentee mentions that the part of the invention "which supplies a supporting spring to the centre pin may be applied with great advantage to the centre pin of bogie trucks in present use."

In applying the invention to carriages, waggon, and trucks, the arrangements are similar to those already mentioned, but such arrangements "can be varied by mechanical equivalents."

[Printed, 1s. 4d. Drawings.]

A.D. 1865, February 17.—N° 454.

DEFRIES, COLEMAN.—(*Provisional protection only.*)—"An improved means of securing the safety of railway passengers."

The object of this invention is to prevent railway passengers from opening the doors of the carriages, and getting out of such carriages while they are in motion. For this purpose a rod is passed under the framing of each carriage, at each side thereof, "the ends meeting, as do the buffers, between the carriages," and there being placed on these rods catches or bolts, which, on the rods being moved to and fro, and which may be accomplished by means of apparatus placed for the purpose in the guard's van, are passed into or released from staples placed at the opening side of each carriage door. The rods may either be moved by means of a lever in the van, or by toothed gearing, and the ends of the rods may be connected, so as to allow for jerks, and the passage of the carriages round curves, by double helical springs, or other suitable means. "A modification of bolt, slot, and spring" may be used if desired so as to permit the doors "to be secured at foot in their centres instead of at the sides."

[Printed, 4d. No Drawings.]

A.D. 1865, February 22.—N° 487.

JESURUM, EUGENIO.—(*A communication from Candido Ravelli.*)—(*Provisional protection only.*)—"Improvements in machinery for stopping railway trains."

In this invention each railway carriage has levers or arms hinged or jointed to the under side of the frame, each lever carrying at its lower end a small elliptical wheel, the arrangement being such that while the train is travelling in the ordinary manner the levers are carried in an inclined position, with the wheels above the rails. Should a stoppage of the train become necessary, however, the levers are allowed to fall, the elliptical wheels then coming down upon the rails, the levers then becoming vertical, the carriages being lifted off their running wheels, and supported upon the small elliptical wheels, and running upon

these until "the forward motion is absorbed in the short up-and-down motions which the running of the elliptical wheels imparts to the carriages." In order to sustain the levers in position when not in use they are then supported by certain hooks and chains, and the locomotive is provided with similar apparatus to the carriages, the arrangements being such, however, that in stopping a train the arms or levers of the locomotive are liberated first, the rising of the locomotive upon the elliptical wheels causing a projection at the back of the locomotive to act upon apparatus which liberates the levers of the first carriage, this in like manner acting upon the next carriage, and so on in succession throughout the train. In order to replace the levers and elliptical wheels in their first positions when it is required to again start the train a "crescent-shaped lump" is applied to each driving wheel of the engine, the latter being reversed, and the train then backed, until the whole rests upon the ordinary wheels, when the levers are raised and secured by the hooks.

[Printed, 4d. No Drawings.]

A.D. 1865, February 23.—N° 513.

ROWE, WILLIAM.—(*Provisional protection only.*)—"Improvements in the construction of buffers for railway carriages."

According to this invention a cylindrical tube or trunk is attached or secured in any suitable manner to each side of the carriage, the ends thereof being enlarged or bell-shaped. In these tubes or trunks are the buffer rods, which are of such length as to extend from one end thereof to the other, and when in their normal position to project to such a distance from the ends of the cylindrical tubes or trunks as to preserve the required distance between the carriages when at rest, the ends of these rods, however, not being provided with the ordinary buffer heads, but being enclosed in cylindrical metallic cases of such diameter as to work freely in the tubes or trunks, the spaces between the metallic cases and the buffer rods being filled up with wood or other material, and the central portion of the tubes or trunks being so contracted as to leave little more space than is requisite for the buffer rods to work freely therein. The spaces between the internal ends of the terminal metallic casings attached to the buffer rods and the contracted central portions of the tubes or trunks are fitted with rings of vulcanized india-rubber, or some

other elastic material. In the case of collision the metallic casings on the ends of the buffer rods are driven into the tubes or trunks, and compress the elastic rings against the contracted portions of the tubes or trunks, thus not only breaking the shock of the collision but preventing the carriages from rising on end or leaving the line, the carriages in fact becoming locked together. If desirable, however, buffer heads may be adapted to the rods, in which case the carriages will not become locked together, although the result will be in other respects the same.

[Printed, 4d. No Drawings.]

A.D. 1865, February 24.—N<sup>o</sup> 520.

DONALD, JOHN KENNEDY. —(*Provisional protection only.*)—  
“Improvements in the permanent way and rolling stock of  
“railways.”

That part of this invention which relates to the rolling stock of railways consists in “connecting the draw bar of each carriage by  
“means of a screw coupling or the like to a rigid hook upon the  
“other carriage. There will thus be two couplings between  
“every two carriages, the spring of each carriage being acted on  
“by a separate coupling, so that when the weaker spring is drawn  
“out the stronger spring must receive its share of the strain,” the  
jolting usually caused by the unavoidable difference in the strength  
of the draw springs of different carriages being thus avoided.

Another part of the invention consists in forming the rails of railways with the ends “cut obliquely,” or rolling the rails “in  
“halves” and bolting them together “with the joints on one side  
“between those on the other side,” these arrangements being also  
meant to prevent jolting of the carriages, which object may also  
be effected by using rails composed of two plain bars with a  
thickness of wood between them, the joints of the three being so  
disposed that “no two joints ever occur together.”

[Printed, 4d. No Drawings.]

A.D. 1865, March 1.—N<sup>o</sup> 573.

HOLIDAY, WILLIAM.—“Improvements in presses for blocking  
“the tyres of railway and other wheels.”

This invention relates to “the application of steam to presses”  
for blocking the tyres of railway and other wheels. A bottom or  
bed plate is first prepared, upon which the tyre is laid with the



flange downwards, there being arranged above the bed plate a large cylinder, supported by pillars, and furnished with a piston, the rod of which projects downwards, and has connected to it a large horizontal plate, from the centre of which further projects a conical pin. The cylinder is provided with suitable apparatus by means of which steam may be admitted thereto from a boiler and discharged therefrom at pleasure, and on steam being introduced above the piston the latter is forced down and thrusts the conical plug between certain segments which are placed inside the tyre, these latter being thus forced away from each other and their outer surfaces pressing against and giving the true figure to the inner surface and rim of the tyre, the compression of the latter between the bed plate and the plate carried by the piston also giving truth to the opposite sides of the tyre.

The invention may be modified by connecting the horizontal plate with the conical pin to a cylinder which is moveable upon a stationary piston, instead of connecting such plate and pin to a moveable piston, as mentioned above.

[Printed, 1s. 6d. Drawings.]

A.D. 1865, March 4.—N<sup>o</sup> 609.

MORRIS, DANIEL, MORRIS, JOSEPH, and MORRIS, JAMES.

—"Improvements in apparatus for coupling and uncoupling railway waggons or carriages."

The object of this invention is to couple railway waggons and carriages without persons going between them. This is effected by the use of a lever, mounted so as to be capable of moving to and fro in slides which project from the end of a carriage, there being at the outer end of this lever a hook, a bent arm being moreover connected to the lever, and this bent arm being jointed to a vertical rod, the arrangement being such that by moving one of two levers which are connected to the rod the hooked lever may be made to engage with, or be disengaged from a projecting plate or fixing attached to another carriage, the levers connected to the vertical rod being arranged horizontally, with their ends projecting beyond the sides of the waggon or carriage, so as to be easily laid hold of by persons standing at either side thereof. In order to prevent the hooked lever from being drawn out of the slides it is connected by a shackle and links to the end of the carriage or waggon, and a spring guide and double inclined block

are so arranged as to keep the levers connected with the vertical rod in any required position, a spring coiled round that rod, moreover, preventing the hooked lever from leaving the plate or fixing with which it has been engaged until required to do so. The apparatus is used in duplicate, both ends of each carriage being provided with both hook and plate or fixing.

[Printed, 10d. Drawing.]

A.D. 1865, March 4.—N° 614.

WHITLEY, JOSEPH.—Improvements in casting steel railway “ wheel tyres.”

In this invention “ a mould is used which when at work is “ caused to revolve at a high speed;” this part of the invention not, however, being new. In this case, however, the mould “ is “ caused to revolve in a horizontal plane, and the inner surface “ of the periphery of the mould is as heretofore of a like contour “ or section to the periphery of the tyre. In place of using these “ rotatory moulds in a cold or comparatively cold state, the mould “ is first heated to a high heat, say a good red heat, and is used “ in that condition. When desired, a steel tyre, after it has been “ cast in the revolving mould, may be retained in and be allowed “ to cool down with the mould, and thus, by protracting the “ time of cooling more or less, anneal the tyre, or the tyre may “ be annealed after it has been removed from the mould. Steel “ tyres thus manufactured, when not sufficiently true or not “ of the gauge desired, may be rolled or further formed after “ casting.”

The details of the invention are minutely described, but the patentee states that he does not confine himself to such details, “ so long as moulds (which when at work are caused to revolve at “ a high speed) are heated to a high heat preparatory to the “ casting process;” the annealing of the tyres by cooling them in the revolving moulds in which they are cast being also set forth as an important feature of the invention.

[Printed, 8d. Drawing.]

A.D. 1865, March 6.—N° 626.

OLIVER, WILLIAM JOHN.—(*Provisional protection only.*)—“ An “ improved means of securing and protecting the india-rubber “ rings of buffer springs of railway carriages, which invention is

" also applicable to air pump and valve seatings, and lids faced  
" with india-rubber."

This invention relates to those buffer springs of railway carriages which consist of a number of vulcanized india-rubber rings or collars separated from each other by plates or washers of metal, the buffer rod working through apertures in the rings or collars and plates or washers. The inventor mentions that the india-rubber rings or collars are liable to be destroyed by being split and broken, especially by the angular thrusts or blows to which they are subjected when the carriages are retarded or stopped on sharp curves. And the object of the invention is to protect the said rings or collars, which is effected by covering or coating the plates or washers of metal with vulcanite or ebonite, " to which covering or coating the ring or collar of india-rubber " is attached or secured by a solution of india-rubber and vulcanizing." Or instead of the plates or washers of metal the inventor employs " discs of vulcanite, ebonite, balata, gutta percha in combination with india-rubber, which discs are provided with metal eyes or apertures through which the buffer rod works, and the rings or rollers of india-rubber are secured thereto, as above described."

India-rubber is secured by the same means to the seats of valves and the lids of air pumps.

[Printed, 4d. No Drawings.]

A.D. 1865, March 9.—N° 661.

JAMES, WILLIAM HENRY.—" Improvements in carriage way-  
" and in carriages for the same."

This invention consists of improvements upon an invention for which a Patent was granted to the present patentee on the 16th of September, 1842, according to one part of which the patentee proposed to form carriage ways suitable for vehicles for the conveyance of goods and passengers by means of a series of parallel rods, bars, wires, or strips of metal or other suitable material, carried over a series of horizontal intermediate spring bearings, placed at intervals across the lines of carriage way on posts, pillars, or other suitable supports fixed in the ground, such rods, bars, wires, or strips being constantly kept in a state of tension by mechanical means. According to that invention the carriage ways " were only intended to be formed upon a dead

" level, the posts, pillars, or piles which support the carriage way " being made of various heights to suit the irregularities of the " ground " over which the carriage way passes, but according to the present invention such posts or pillars are not fixed in the ground, but are supported in sockets, and so arranged as to suit any irregularities of the surface of such ground ; this arrangement admitting of all the posts or pillars being of equal length.

According to another part of this invention the spring bearings, which form a part of the former invention, are abolished, " with " the object of preventing oscillations of the carriages or platforms " when traversing the carriage ways, or the depression of the " carriage ways themselves to a greater degree on one side than " the other by the unequal loading of such carriages."

According to another part of the invention the rods, bars, or wires, or strips of metal constituting the carriage way, are supported in semicircular grooves formed in those cross bearings which are permanently fixed on the posts, or other supports of the carriage ways, and retained therein by means of thin sheet metal, corrugated so as to fit over them, and then fastened to such cross bearings, so as to be readily detached when requisite, sufficient end play being allowed for the rods, bars, or wires to slide to and fro through them.

According to other parts of the invention, which is described at great length, chains, ropes, framework, or plates of metal are used in place of the rods or strips of metal, such chains, ropes, or other appliances being kept in a state of tension by means of wheels, pinions, and ratchets, instead of the bent weighted levers described in the Specification of the former Patent, and such carriage ways being made to follow the undulations of the ground over which they pass, instead of being carried " upon a dead " level."

That part of the invention which relates to the construction of carriages consists in the employment of " jointed platforms, usually " of very considerable length and of two kinds, each involving a " somewhat different construction of carriage way, the one being " more suitable for carriages running at a very high velocity " than the other." All these arrangements are very fully set forth.

[Printed, &c. No Drawings.]

A.D. 1865, March 9.—N<sup>o</sup> 665.

ALLEN, WILLIAM DANIEL.—“Improvements in the manufacture of railway wheel tyres, and in the implements or tools employed in such manufacture.”

This invention consists in “forming rings or hoops to be rolled into railway wheel tyres with their peripheries bevilled, so that their diameter is greater at one edge than at the other,” the patentee stating that a ring or hoop so shaped may be with great facility rolled into a tyre, “as the larger diameter edge of such ring or hoop will in the rolls most readily form the flange of the tyre.” In carrying out the invention the patentee makes the anvil block of a steam or other hammer “with a projecting beak, placed at such an angle to the face of the falling hammer that when a ring or hoop is placed upon the beak of the anvil and hammered the required degree of bevil is given to it; the side of the anvil block from which the beak projects may also be inclined to about a right angle with the beak, so as to support the ring or hoop in its sloping position. The rings or hoops to be bevilled in this manner may be cast in rings, or forged from masses of steel by either punching, cutting, or otherwise forming the hole therein,” and the anvil block, in addition to the projecting beak and sloping side, may have a flat surface as usual for the purpose of working the sides of the rings or hoops, so that the periphery may be wrought upon the beak and the sides upon the flat face alternately, as desirable.

In order to strengthen the projecting beak of the anvil, the anvil block is cast of steel, or a mixture of steel and cast iron, but cast iron alone may be used. Rings or hoops may also be bevilled by forging or other means, or by heating one side of a round mass or thick slab hotter than the other, “when it will be found that the hottest side will spread in the flattening process to a larger diameter than the cooler side.

[Printed, &c. Drawing.]

A.D. 1865, March 11.—N<sup>o</sup> 688.

KERNOT, CHARLES MIDDLETON, and SYMONS, NATHANIEL.—(Provisional protection not allowed.)—“Improvements in the construction of railway plant, to ensure the safety of passengers’ lives in the event of accident or collision.”

One part of this invention consists in constructing railway car-

riages "in two independent parts, so that the lower portion shall receive the whole effect of any concussion, and the upper or passengers' compartment shall be made to yield in such a manner as to relieve the occupants from any sudden and injurious effects of a shock."

Another part of the invention "is designed to lessen the risk of accidents caused by the contraction and expansion of metals." The inventors propose to attain this object by "making the wheels and tires in sections, binding their inner edges with wood, gutta percha, or other flexible material capable of yielding to the action of the temperature upon the metal portion of the wheel," the inventors stating that as by this arrangement "the tire is a fixed portion of the wheel, and not separate, all risks of accidents from it suddenly coming off while the train is in motion, a not unfrequent occurrence, will be removed."

Additional safety may also be obtained by the use of "an improved tram," composed of metal "embedded in wood or any flexible material, or secured in the ordinary mode," the arrangement being such that upon either of the outer edges getting worn it will only be necessary to turn the metal. "The trams can thus be changed eight times without removal."

[Printed, 4d. No Drawings.]

A.D. 1865, March 17.—N<sup>o</sup> 745.

BONNEVILLE, HENRI ADRIEN. — (*A communication from Charles Louis Joseph Félix Jacquot.*)—"Improvements in railway breaks."

This invention consists "in the application of compressed air as a means of stopping railway trains, by combining pneumatic (air) pumps with a reservoir of air placed on a small one-axled truck which is fixed in front of the locomotive, or forms part of the same. The pumps are to the number of two, three, or four, and are fixed vertically under a hollow sockle forming the bottom of the small truck, with which they communicate by means of valves. The pistons of these pumps are worked by eccentrics, placed on the axle of the small truck. Above the hollow sockle, which serves as a bottom to it, is placed a reservoir, which consists of two hollow cylinders sliding one in the other, the outer one carrying round its upper part a stuffing box intended for rendering more complete the



“ closing of the space existing between the two cylinders ; the  
 “ inside one is fitted with heavy materials in order to compress  
 “ the air which enters the reservoir. The compressed air enters  
 “ by a valve placed in the bottom of the reservoir, which forms  
 “ the bottom part of the sockle. During the progress of the  
 “ train the axle of the small truck in turning acts, by its excentric,  
 “ on the pistons of the pumps, and drives the air into the  
 “ hollow sockle,” the latter being provided with “ a cock opening  
 “ into the outer air, and which is closed when the train is to be  
 “ stopped. The air driven into the sockle, and no longer escaping,  
 “ rushes into the reservoir by the valve placed in its bottom,  
 “ where it is compressed by the action of the pumps, and this  
 “ compression increasing with each rotation of the wheels of the  
 “ truck the pistons work less and less, the wheels cease to turn,  
 “ and the progress of the train is gradually retarded. To set the  
 “ train in motion a second tap has to be opened, and the air  
 “ allowed to escape into the steam cylinder of the locomotive.”

The invention is set forth at considerable length, in some cases the apparatus being made double. “ A pressure guage may be employed in order to indicate the degree of pressure exercised  
 “ in the cylinder.”

[Printed, 8d. Drawing.]

A.D. 1865, March 20.—No 780.

MACKENZIE, ALEXANDER RICHARD. — “ Improvements in  
 “ locomotive engines and carriages for common roads and tramways,  
 “ ways, and also for agricultural and other purposes.”

According to one part of this invention a vehicle will be provided with a boiler or boilers and with a cylinder or cylinders placed in such a position or positions as may be most convenient, and being either oscillating or otherwise, being provided with pistons and suitable appendages by means of which motion is given to a cross shaft divided into three parts, and provided with two clutch boxes of any known construction. The shaft works in any suitable number of bearings, and carries two chain wheels or drums communicating by means of chains with other chain wheels or drums fixed to the naves of the hind or driving wheels, such wheels revolving upon a fixed axle attached to the framework in any known manner, and each being capable of being disconnected from the motive power by putting its corresponding clutch box out of gear. To the lock or fore carriage is fixed a toothed

wheel or segment, communicating by gearing with a hand or steering wheel for enabling the vehicle to be directed either to the right or to the left, " and for shifting the clutch boxes out of " gear there are two levers which are moved as required by the " driver or steersman, so that when the toothed wheel or segment is turned for turning the vehicle, one or other of the " clutches could be thrown out of gear, and thereby enable the " vehicle to be turned in the radius of its own length." In connection with both of the hind or driving wheels are brakes, which may be brought into operation by the foot of the driver or conductor, " the levers which work the brakes acting in connection with the handle or lever connected to the valve for supplying or shutting off the steam.

These arrangements may be variously modified, in some cases the clutch levers being worked by means of a crank, cam, or heart wheel fixed to a vertical shaft which is provided with gearing in connection with a hand wheel; or two cams may be employed, one for each clutch lever, such cams being connected by gearing with the vertical shaft.

Boilers or steam generators may be used of any form or arrangement, but instead of using a vertical chimney the patentee causes the gases arising from combustion to pass through a down flue or down flues below the framework, the ends of the flues where open to the atmosphere being covered by wire gauze or perforated plates, and a moveable ash pan being employed, which can be raised or depressed at pleasure for the purpose of regulating the draught of air to the furnace or furnaces. Instead of allowing the exhaust steam to pass directly into the atmosphere it is conveyed into a suitable receptacle or suitable receptacles to be condensed, the water thus produced being then pumped back into the boiler. Instead of steam, compressed air or any other motive force may be used, and for agricultural or other vehicles moving at a slow rate suitable arrangements of gearing " for diminishing " speed and increasing power " may be used.

[Printed, 10d. Drawing.]

A.D. 1865, March 27.—N° 866.

THOMPSON, JOHN CALVIN, and GREEN, JOHN JAMES MALBOURNE.—"Improvements in the construction of railway " carriages, to facilitate the passage of the guard or other person " from end to end of the train whilst it is travelling."

According to this invention "a gangway is formed from end to end of each carriage, on one side of it, and on the same level as the floor or platform of the carriage," this gangway being "just inside the ordinary doors of the carriage, so that it is completely enclosed by the side and roof of the carriage," but separated from the compartments of the carriage "by a partition fitted with sliding doors, by which any of the compartments may be entered from the gangway. At each end of the carriage the gangway is continued to meet the gangway of the next carriage, and this continuation is made by means of a slide forming a prolongation of the floor of the gangway, and these may, if desired, be coupled together by a pin dropped into eyes on the slides, but the coupling must be so effected as not to interfere with the carriages inclining more or less the one to the other in passing round curves. The sliding portions of the platforms are enclosed at the sides and top by means of canvas or suitable flexible material stretched on frames to keep it in form."

The details of the invention are minutely set forth.

[Printed, 6d. Drawing.]

A.D. 1865, March 28.—N° 878.

WEBB, FRANCIS WILLIAM.—"Improvements in the manufacture of steel tires for railway wheels."

In this invention the patentee casts the steel in a mould of peculiar shape and arrangement, the lower side of the mould being formed by a plate upon which the mould box rests or is secured, such mould box being of such construction "as to form a casting resembling a solid railway wheel with a part attached to one side representing the axle at the outside of the wheel, which is placed in a vertical position in relation to the plate forming the bottom of the mould. That part of the mould box forming the upper side of the tire as it is cast is coned from the part forming the periphery of the tire to the vertical stalk representing the axle, which cone form of the mould allows a free escape for the air or gases when casting, and gives the casting an additional thickness to allow for the consolidation of the metal in the subsequent process. That part of the mould representing the axle extends above the body of the tire, so as to give a sufficient head to the molten metal when

“ poured into the mould to make the casting as sound and uniform as possible. The stalk not only allows ‘head’ in casting, but forms the part where the ‘shrinkage’ of the metal will occur, called ‘piping,’ but as this stalk need only be made use of to facilitate the process of manufacture, and is subsequently removed, that portion of the casting intended to form the tire is as sound as a casting can be made of steel. The casting thus made is next heated sufficiently, and to its stalk a handle may be secured, by which the intended tire can be manipulated, the edge or periphery of which is brought between swages of suitable form acting by pressure or percussion so as to consolidate the metal. The casting is then placed upon a flat block, or a swage of suitable shape, having a hole in its centre to receive the stalk, and is consolidated by another flat surface or swage of suitable form, acting upon its upper side by pressure or percussion; then a punch is brought upon the centre of the casting and forced through it by pressure or percussion, driving out that part of the metal to which the stalk is attached; or the stalk may be turned or bored out, and the tire completed in the usual manner.”

The details of the invention are minutely described, “taper punches” being used in some cases to consolidate the metal; or the latter being operated upon on a “beck anvil.”

[Printed, 16d. Drawing.]

A.D. 1865, March 31.—N<sup>o</sup> 916.

STEPHENSON, GEORGE ROBERT, and PHIPPS, GEORGE HENRY.—(*A communication from George John Horner.*)—(*Provisional protection only.*)—“Improvements in the construction of locomotive engines and railway carriages for facilitating their passage round curves.”

This invention consists of “a combination of the axles, axle boxes, and framing of locomotive engines and railway carriages generally, whereby any of the axles of such engines or carriages to which the invention may be applied take up a position pointing radially towards or near to the centre of any curved portion of railway, on which the said engines or carriages may be working, and thus facilitate the passing round such curve. This object may be accomplished by connecting the axle boxes to the side framing of any engine or carriage by means of radial links, so placed that whenever through the

" action of the curve the axle and with it the axle boxes undergo any end-on motion with respect to the frame, the axle is also forced by the action of the radial links to undergo the requisite amount of angular motion to plant it at or near to a direction radial to the curve of the railway."

" When this invention is used, the horn plates now generally in use for guiding the axle boxes may be entirely dispensed with, or retained as a safeguard in the event of the breakage of the radial links; but, if so retained, sufficient clearance must be allowed between the jaws of the horn plates and the axle box to allow the greatest amount of angular motion of the axle to which the sharpest curve can give rise; and the axle boxes must also have sufficient clearance in a direction at right angles to the frame to admit of the greatest amount of end-on motion to which the axle can be subject."

[Printed, 4d. No Drawings.]

A.D. 1865, April 10,—N° 1021.

VOIGT, GEORGE.—(*Provisional protection only.*) — " Improved mechanical arrangements for stopping or retarding railway carriages, waggons, and trucks."

This invention consists " in causing the buffer rods to work the breaks," which is accomplished by lowering the buffers and buffer rods to a level with the axles of the wheels, " so that the break blocks, which are affixed to the ends of the buffer rods, come directly opposite the flanges of the wheels." In order that the buffer rods may be so lowered, " the main framing of the carriage should be prolonged downwards, and the buffer rods made to work easily through bearings placed in the said projecting portion," and to prevent the carriages " from rushing upon each other distance pieces may be fitted to the back and front framing of each carriage, and may be made to fold up out of the way when not required, the said distance pieces being of such a length that the break blocks may come against the flanges of the wheels when the buffers of any carriage are pressed by the previous or following carriage or carriages. As soon as the train is stopped, or a uniform retarded speed is obtained, the carriages adjust themselves, and so relieve the wheels from the action of the breaks."

[Printed, 4d. No Drawings.]

A.D. 1865, April 11.—N° 1022.

MYERS, JAMES JOHN.—(*Provisional protection only.*)—"A new  
" or improved compensating wheel to be used with locomotives,  
" carriages, and other vehicles on railway and tram roads, in con-  
" junction with or without the wheels now used, in order to  
" obtain at curves and other parts of the road a rolling instead  
" of a sledging motion now effected by wheels in present use on  
" railway or other tram roads."

The inventor uses, in the first place, a disc or circle of metal or other material of less diameter than ordinary wheels, "which disc  
" or circle is to be keyed fast on the same axle at the opposite  
" end to another fixed wheel similar to that now used on rail-  
" ways," and which wheel it is proposed to use still "in connec-  
" tion with and alternately with" the invention, the disc or circle  
being provided with a loose tyre, which renders it equal in diameter to the other wheel, this tyre being furnished with an outside flange which overlaps the rail, and also with an inside flange which works inside a groove or grooves formed in the disc, "by  
" means of two or more metallic plates or circles fastened or  
" bolted together." The tyre and disc are thus enabled to move independently of each other in passing round curves, the other wheel travelling as usual.

In some cases the inner flange is dispensed with and the loose tyre grooved internally, studs or pieces of metal projecting from the disc preventing the tyre from leaving it. Suitable lubricating means are provided to prevent excessive friction between the parts.

[Printed, 4d. No Drawings.]

A.D. 1865, April 11.—N° 1035.

DADLEY, JOSIAH.—(*Provisional protection only.*)—"Improve-  
" ments in couplings for railway carriages, waggons, trucks, and  
" other vehicles."

The object of this invention is to enable carriages to be united without the necessity of persons passing between them. The improved coupling "consists of a hook and eye, one of each being  
" attached to each end of the carriage, waggon, or truck. The  
" eye, which is composed of iron or steel, is made to rise and fall  
" back by means of a hinge when not in use, so as to prevent the  
" carriages or waggons from uniting when not desired. The



"hook, which is composed of the same material as the eye, is made with the sloping point turned down at the extremity, so as to catch the eye when let down when the carriages are desired to be united, the eye sliding up the hook and falling into the recess. Lest the distance between the carriages, waggons, or trucks should not in every case be exactly the same, so that the eyes might not fall into the hooks, and in order to screw up the carriages, waggons, or trucks after the coupling is effected," the hook "is made to screw out or in by means of a star nut, which may be clamped by means of a pall or otherwise."

[Printed, 4d. No Drawings.]

A.D. 1865, April 17.—N<sup>o</sup> 1075.

MORGAN, EDWARD, and MORGAN, GEORGE HENRY.—  
"Improvements in apparatus for covering railway trucks or vans and other carriages."

According to this invention the ends of a truck or van or other carriage, are, by preference, made semicircular at the top and to stand higher than the sides, this, however, not being essential in all cases. On these or other suitable ends are centres or axes, each of which has upon it two radial arms which are connected together in pairs at their outer ends by horizontal bars, two frames being thus formed to which the covering material is attached, the latter being divided into two sheets, and one edge of each sheet being fixed along the horizontal bar of one of the frames. The other edge of each sheet is fixed along the upper side of the van or truck or other carriage, and thus when the radial arms are down in their lowest position, the covering sheets are folded up close against the sides of the vehicle, which is now left open, but when the arms are raised into a vertical position the two sheets meet over the vehicle, "and form an arched roof over it." The ends of the sheets are connected to rings which slide along guide rails or cords fixed to the ends of the van, and the radial arms may be raised and lowered by means of rods and bell-crank levers, which are moved by means of a bar running lengthwise of the vehicle to which motion is given by a screw or other convenient means. Other means, however, of raising and lowering the radial arms may be adopted. The invention may be modified by employing four pairs of radial arms, the covering sheet being in this case in one piece only, the two edges thereof being fixed to

two horizontal bars which connect two pairs of the arms, while the middle portion is fixed to bars which connect the other arms, the arrangement being such that the middle part of the covering is constantly extended, and is capable of being moved towards the one side or the other of the vehicle, the other portion of the cover being capable of being folded. Other modifications of the invention may be made, according to circumstances, in some cases; as, for instance, in the covering of the roof of an omnibus, glass being employed in place of part of the covering sheet.

[Printed, 1s. 8d. Drawings.]

A.D. 1865, April 19.—N° 1090.

RIDDELL, WILLIAM. — (*Provisional protection only.*)—"Improvements in the means of covering railway trucks, vans, and other carriages."

This invention consists principally in the employment of what are known as "flexible shutters," or "revolving shutters," for the purpose of covering in or protecting railway and other trucks, vans, and carriages laden with merchandise, in place of the tarpaulings usually employed for such purposes. The vehicle "must be furnished with an iron framing (as high as the goods are intended to be laden, or rather higher,) having grooves wherein the ends or sides of the shutter slide. The shutter should be made (by preference) of iron," but it may be of other material, and it may either be wound upon a roller by means of a handle, when not in use, or it may be made self-oiling by means of springs, and so arranged as to slide into a box at the end or under the bottom of the truck, van, or carriage. The shutters, when placed over the goods, may be locked or otherwise secured, and the inventor mentions that although the first cost of these shutters is somewhat greater than that of the tarpaulings generally used, "a considerable economy in the cost of maintaining them in an efficient state will be effected," owing to the greater durability of the shutters.

[Printed, 4d. No Drawings.]

A.D. 1865, April 21.—N° 1114.

DAY, WILLIAM. — (*Provisional protection only.*)—"Improvements in wheels, and the manner of applying the same to railway carriages for passengers' and goods' traffic, as also the leading wheels for locomotives."

This invention consists principally "in so mounting or arranging the wheels of railway carriages that they may revolve independent of each other, and if an axle be used it must be so constructed as not only to leave the wheels free action to revolve, but also the power of adapting themselves to curves," the inventor purposing to apply the same system to the leading wheels of locomotives. This is effected "by applying on the sides of railway trucks or carriages strong iron guards or supports, which may be placed separate or connected together for passing across the bottom or frame of the carriage; these iron guards or supports have an opening for receiving a projecting boss on the outside of the railway wheels, over which a combined axle box and grease holder is applied, fitted with a cover on the outside over a flange fixed on the centre boss or axle of the wheel, by which means it is held in position." This axle box has two projecting arms which extend on each side towards the radius of the wheels, and are attached by strong chains to corresponding fastenings on the side of the carriage, and form in reality the draught; as the inventor purposes the main draught and coupling "to be as ordinarily adopted," the main draught to be on the carriage, and the carriage to draw the wheels. "These lateral arms work through slots, guides, or openings in the open guard, and at the top side of the axle box the metal extends up and terminates in a hardened point, which works up against a corresponding socket which is supported by any suitable elastic bearing or spring, and which in reality forms the spring of the carriage to afford ease in travelling, or counteract the oscillating or shaking from rapid transit over an irregular surface. Below the axle box a fourth projection extends downwards, and is provided with the means of riding in or on a bar" at that part "which connects the lower ends of the wheel guards first described; or other equivalent means for holding and steadying the wheel and wheel guard may be adopted."

The inventor mentions that in giving effect to this arrangement he prefers that "all the parts should be nicely fitted, with little play or looseness on the one side of the carriage," there being on the other side "a certain amount of freedom to enable the wheels more readily to adapt themselves to curves over which they will have to travel."

[Printed, 4d. No Drawings.]

A.D. 1865, April 25.—N° 1158.

BUCKNILL, JOHN TOWNSEND.—“Improvements in the construction of railway rails and wheels.”

According to one part of this invention the heads of rails “are made wedge-shaped, or inclined at the sides and flat on the top or table,” the tyre of each of the driving wheels of the locomotive engine being furnished with a groove corresponding with the form of the head of the rail, “so that the driving wheels rest on the sides of the rail, and do not bear on the top or table,” the two sides of the groove thus nipping the head of the rail, and a “greatly increased adhesion” being obtained. The other wheels of the train may run upon the top or table of the rail in the usual manner.

When there are portions of a line which consist of steep inclines (for the passage up which of locomotives and trains the first part of this invention is more especially adapted), while the other parts are comparatively level, “it is desirable to make the driving wheels of the engine double, that is to say, one part grooved, and another part plain, so that on the level the plain parts of the driving wheels may run on ordinary rails, on which also the carriages of the train travel, whilst on the inclines the grooved parts of the driving wheels run upon rails with wedge-shaped heads, as before described.”

Different modifications of the invention are described, in some cases the arrangement being such that when the driving wheels of the locomotive are running on the wedge rails, the leading and trailing wheels, which are each formed of two different diameters, may also run upon these rails, so as to raise the locomotive uniformly from end to end, the wedge rails being in general laid at the side of the ordinary rails, and only on portions of the line “that are at a steep gradient,” arrangements for shunting a train from one line of rails to another when a double line is used being also set forth.

[Printed, 8d. Drawing.]

A.D. 1865, May 16.—N° 1362.

CHAVANNE, ANDRÉ.—“A new mail-catching apparatus for bags or packages without stopping the express trains or others.”

According to one part of this invention there is connected horizontally to the side of the mail or “post-office” carriage of a train a cylinder which is open at both ends. The mail to be

delivered from the train is placed in a cylindrical case or mail bag, by preference of metal, this bag being placed in the rear end of the cylinder, and supported therein by rings on its exterior which slide upon a rod fixed to the top of such cylinder. The mail to be picked up by the train is placed in a similar bag or case to that which contains the mail to be delivered, and this bag rests or is supported on parallel rods carried by an arm projecting from a post which stands at the side of the line of rails. The post is placed in such a position that the mail bag supported thereby will be received into the cylinder on the mail carriage as the train passes the post; the cylinder is for this purpose made of sufficient internal diameter to allow of the mail bag or case entering the cylinder in spite of any rocking motion there may be on the carriage, a slot being also formed through the bottom of the cylinder from one end thereof to the other, so that the bottom of the cylinder may not come into contact with the arm which supports the bag to be picked up. When the latter enters the cylinder, the bag to be delivered, and which has previously been placed in the cylinder, strikes against the mail bag to be picked up and imparts its momentum to it, so that the bag to be delivered passes out of the rear end of the cylinder, whilst the other bag remains in the cylinder, and is carried on within it, the bag which passes out of the cylinder being received upon a rod which passes through rings on the under side of the bag, such rod being supported by the post already mentioned. In order to insure the bag which is picked up by the cylinder remaining therein, a network or partition of tarred ropes is placed across the centre of the cylinder, and connected thereto by rings or eyes which run on rods carried by the cylinder, in order that the network or partition may be capable of sliding backwards a distance towards the rear end of the cylinder. "Each of the mail bags is furnished with  
" with a buffer or pad at its end, so as to lessen the blow of the  
" two bags striking against each other."

The details of the invention are capable of being variously modified.

[Printed, 8d. Drawing.]

A.D. 1865, May 18.—N<sup>o</sup> 1374.

MITCHELL, JOSEPH, and TILFOURD, GEORGE.—(*Provisional protection only.*)—"An improved method of testing railway and  
" other springs."

The object of this invention is accomplished in part "by the forcing of air into an accumulator by the aid of an air pump worked either by hand or steam power, and on the other part by forcing water into the same accumulator by an hydraulic pump" worked by the same means. "The air, being the elastic body, is compressed by the action of the water upon it, and when the required pressure is thus obtained it is released from the accumulator by a lever acting upon a valve into an horizontal cylinder, which forces a ram, and consequently compresses the spring into a straight line or beyond to any degree required, which returns to its original curvature by pressing a lever which opens a valve and releases part of the accumulated water through a waste pipe."

The inventors claim "the combined action of air and water" in testing railway and other springs, "in contradistinction to steam or hydraulic power separately, as now in use."

[Printed, 4d. No Drawings.]

A.D. 1865, May 20.—N° 1398.

ARMSTRONG, JOSEPH.—"Improvements in the manufacture of crossings for the permanent way of railways, and also in tyres for wheels."

That part of this invention which relates to making tyres for wheels consists in "casting an ingot of steel sufficiently long to form one or more tyres in one ingot," such ingots having elongated core holes through them at suitable distances. In this form they can be readily hammered upon all sides, then cut off in lengths, each length to form a bloom for a tyre, with the necessary hole through for rolling into a weldless tyre, after blocking in the ordinary way to form the rough flange."

That part of the invention which relates to crossings for the permanent way of railways consists "in making a crossing from an ordinary ingot of steel, or bloom of iron." An ingot, for example, may be forged into a suitable shape, and then put into proper dies under hydraulic or other pressure, and pressed to the proper section required; or a bloom of steel or iron may be hammered in dies, or otherwise treated so as to produce "double-headed reversible crossings or otherwise." The patentee mentions that the forms of these crossings were described by him in the Specification of a former Patent, granted to him on the



28th of October, 1856, No. 2530, such crossings being cast in moulds, but that by this invention he forges them "as described above."

[Printed, 6d. Drawing.]

A.D. 1865, May 25.—N° 1425.

**RAMSBOTTOM, JOHN.** — "Improvements in machinery employed in the manufacture of hoops and tyres."

This invention relates to certain improvements upon the invention for which Letters Patent were granted to the present patentee on the 7th of January, 1864, No. 48, and it consists "in making the taper mandril described in the Specification of the said Patent with shallow spiral grooves, so as to enable it to be introduced into the hoop partly by rotation on its axis and partly by end pressure. The improved grooved taper mandril may be used for expanding the hoops, either in combination with a duplex steam hammer, as described in the Specification above referred to, or in combination with lateral and edge rollers or blocks."

Another part of the invention relates to the rolls employed in rolling hoops and tyres, and consists "in making oblique grooves on the face of the roughing rolls to force the metal to one side of the hoop for the purpose of forming the flange of the tyre; by this means a tyre may be rolled out of a cylindrical or slightly conical hoop."

The details of the invention are set forth at some length, but will not be clearly understood without an inspection of the Drawings annexed to the Specification.

[Printed, 1s. 2d. Drawings.]

A.D. 1865, May 25.—N° 1426.

**FIRTH, JOHN.** — "Improvements in the manufacture of cast-steel railway tires."

This invention consists in "hammering a hollow tube of cast steel on a mandril until it is reduced in thickness, and then again hammering it between tools of appropriate shape for the purpose of raising projections to form the flanges of the finished tyres, and so solidifying the metal." Thus a hollow cylindrical casting, of a length suitable for making several tires, is employed, which is first well hammered on a mandril to reduce its thickness

and render it more tough. It is then hammered between the face of a hammer and anvil, in which grooves are formed to produce raised parts at intervals around the cylinder. It is then removed from the mandril and placed in a lathe, in order that the cylinder may be cut through and divided at the parts where the projections are formed, and it is preferred that each projection should be of a size to produce the flanges of two tyres, this, however, not being essential, as each projection may be produced so as to be suitable for one flange, in which case the cut, in place of being through a projection will be on one side of it. The mandrils employed should have sufficient taper to facilitate their removal when requisite, and the cylinder having been divided or cut into parts, each part being suitable for forming a flanged tyre, such parts are to be finished in any ordinary tyre rolling mill, the patentee stating that tyres thus formed are more solid and better in all respects than tyres cast singly and afterwards rolled, or than tyres cast together in the form of a cylinder, but not hammered or rolled.

Instead of casting the steel of an uniform cylindrical shape on its external surface, and producing the projections around it by forging or hammering, a casting may be produced with the projections upon it, such a casting being cut in a lathe into several rings, and if desirable hammered before being so cut.

[Printed, 10d. Drawing.]

A.D. 1865, May 25.—N<sup>o</sup> 1431.

BARBAIX, JULES XAVIER JOSEPH.—(*Provisional protection only.*)—"Certain improvements in brakes for railway carriages."

The object of this invention is to effect the stopping of railway carriages "by utilizing the force which acts on the buffer when "the speed of the train is slackened," and the invention consists in "transmitting the recoil movement of the buffers (produced by "the slackening of the speed of the train) by means of rods "suitably made and fixed to the rod of the buffers, and to a "spring which acts direct by means of a lever upon the shaft of "the brake, which is adapted to the carriage," or with which it is already provided.

The inventor mentions by way of example a case in which a carriage is provided with braks blocks with a shaft and a collar, with or without a slide lever, in which case he dispenses with the crank arm and the lever upon which the guard acts, and replaces

it by mechanism which consists of a vertical lever applied to the main shaft of the brake, such lever having therein a hole, which "by means of a cap or a fork provided with holes is fixed to a lever by means of a bolt. A rod of a variable length, with which the cap or fork is provided, has an arm piece with a hinge which unites it to a spring, which spring being supported by guides, or by the sleepers of the carriage, acts horizontally. Each extremity of the spring is joined to the rod of the buffer by a cap provided with a rod, which rod is joined to that of the buffer by means of an arm piece, having a socket and hinge, which allows the traction spring its full play." Thus "any recoil movement of the buffer is transmitted to the lever and forces the blocks to press on the wheels, which pressure is stronger as the back movement of the buffer is greater."

In order to provide for the backing of a train the buffer bar is furnished with "two cast-iron ears, perforated with a hole, between which ears is a stopper." The stoppers of each buffer are joined by a bar, "which allows of raising them up together at each side of the carriage."

Modifications of the invention are described as being applicable to carriages not provided with buffers or traction springs. "A stopper placed on the rod of the buffer, or on the rod, will serve to unlock the brake. If it is fixed with a socket and cylinder the brake will unlock as soon as the train is in motion."

[Printed, 4d. No Drawings.]

A.D. 1865, May 27.—N<sup>o</sup> 1455.

ROWAN, JOHN MARTIN. — (*Provisional protection only.*)—"Improvements in making cast-steel railway tires, and in apparatus therefor."

In this invention a cast-steel ingot having been hammered on its sides and ends is sawn into cheese-shaped pieces, each of a size and weight suitable for making one tyre, the sawing being effected by a circular saw, working in a vertical plane. The ingot is carried by a headstock fitted upon a bed frame, which is mounted on trunnions, and can be turned over to bear the ingot towards the circular saw. The headstock is fitted to slide on the bed frame, and is shifted after each cut to move the ingot forward for a fresh cut, and the end of the ingot close to the cut is supported by a second headstock fitted with three rollers, arranged in spiral grooves, which admit of their being separately adjusted.

The end of the ingot carried by the first headstock is held by screw chuck clamps upon a face plate, the spindle of which is mounted to turn in a bearing in the headstock, and whilst the saw is acting the ingot is turned round continuously or at intervals, each portion sawn off being hammered in the usual way upon an anvil, the hammer being made to cause such portion to bulge a little at the middle of its periphery.

The flange of the tyre is formed by placing the "cheese" in a matrix, having a concavity round its upper edge corresponding with the required flange, the cheese, which is at first deeper than the matrix, being hammered until its upper part fills the concavity, hammers of different forms being used, and the bottom of the matrix being provided with a hole, in which there is a bolt or spindle having a head upon it, the hammering of the cheese causing an indentation to be made in it, which facilitates the subsequent punching out of the centre, which is effected in the usual manner; but instead of such centre being enlarged by means of conical mandrils, as most usual, such enlarging is effected by rolling in a mill specially arranged for the purpose, this mill differing from the ordinary "breaking down" mill, in having a support for the inside end of the middle roller, and inside rollers of gradually increasing diameter being used in succession during the operation, there being on the upper spindle of each inside roller a loose ring, filling up the upper bearing, and such ring being cut away on one side to allow the roller to enter in between the flanges of the external roller. The tyre is subsequently finished in a breaking-down mill in the ordinary way.

The obtaining of the flange on the cheese may be effected by means of three or more suitably grooved rollers, instead of in the manner described above.

[Printed, 4d. No Drawings.]

A.D. 1865, May 31.—N° 1492.

HOWARTH, RICHARD.—(*Provisional protection only.*)—"Improvements in apparatus for increasing the safety of railway passengers and trains, signalling, lighting, and forming a communication between all parts of such trains, also for securing the carriage doors."

One part of this invention consists in so arranging the fitting of the footboards of railway carriages that they may form a con-

tinuous platform or gangway along the sides of the train. On each side of the carriages brackets or arms are placed, "which turn radially and carry the footboards (which are mounted thereon) in and out from and parallel with the sides of the carriages, and forwards at one end." These footboards are equal in length to the distance between the buffers at the two ends of the carriage, or nearly so, the arrangement being such that the guard may easily pass from one carriage to another, the ends of the boards being bevelled "so that one will slide under the other when the compression of the buffers causes them to meet and pass each other." These arrangements may be variously modified, the ends of the footboards being in some cases connected together by "slots and spring studs, so that the guard, by means of a lever, screw, or other power, may be able to move the entire platform when necessary," while in other cases the footboards, instead of being connected to radiating brackets, are "hinged to rise and fall," being supported, when raised, upon such radial brackets.

Another part of the invention consists "in the introduction of a shaft and levers along each side of the carriages and coupled at the ends, carrying rising and falling steps at the doors, and securing the doors thereby," this part of the invention embracing various arrangements of flexible and other cranks, step bearers, and other apparatus, signal lamps being included in such arrangements.

Another part of the invention relates to modes of lighting carriages and signal lamps by means of gas; but this, as well as certain other parts of the invention, will be noticed in another series of abridgments.

[Printed, 4d. No Drawings.]

A.D. 1865, May 31.—N<sup>o</sup> 1495.

HAZELDINE, FREDERICK.—(*Provisional protection only.*)—"Improvements in the construction of vans, waggons, or carts employed for transporting furniture and other goods on common roads and railways."

This invention consists "in substituting wrought-iron lattice-work, or a combination of iron and woodwork on the girder and tension principles, in place of the ordinary wooden framing at present employed in the construction of vans, waggons, or

“ carts, and in covering the whole with corrugated metal (zinc by preference), mahogany panelling, tarpaulin, macintosh, or other suitable material, and further in arranging or disposing the rods employed to form the sides of the vans, waggons, or carts either in parallel lines to each other, or diagonally to the bottom sides of the vans, waggons, or carts.”

The inventor states that by these means vans, &c. may be made much lighter, more durable, and capable of being more easily repaired than those heretofore constructed.

[Printed, 4d. No Drawings.]

A.D. 1865, June 5.—N<sup>o</sup> 1542.

TOLHAUSEN, FREDERICK.—(*A communication from Eugène Dutheil.*)—(*Provisional protection only.*)—“ An improved break, applicable to various descriptions of steam engines, and also to railway purposes.”

This invention relates to “ instantaneously converting the steam cylinder of any stationary or other steam engine into a compressed air cylinder ” by the following means :—When it is desired to stop the engine, with or without the use of the ordinary breaks, the steam is shut off from the cylinder by means of an intermediate slide valve, which is interposed between the ordinary slide face and the usual D or other slide valve, such intermediate valve having three ports which correspond with the three ports of the slide valve face, and give ready ingress for the steam by the said ports. The intermediate slide is worked by a handle and convenient lever gear at the command of the engine driver. The bottom of the cylinder is provided with a suitable valve for the admission of air, and while the steam works the piston this valve remains closed, but when the steam is shut off by moving the intermediate valve so as to close the ports, the outer air enters and fills the cylinder during the back stroke, and the engine continuing her motion by reason of her momentum, the inlet valve shuts at the forward stroke, and the air is compressed in the cylinder so as to form an air cushion, acting as a break. In order to provide egress for this compressed air an outlet valve is placed at the bottom of the cylinder, which is loaded with or held down by a double-armed lever, connected with a plunger or piston working in the steam chest, and acted upon by the pressure of the steam shut off. This lever is so constructed as to allow the escape valve to open when the necessary pressure of air is obtained, thus affording



a ready escape for the air; the steam piston then performs another back stroke, filling the cylinder again with air, which is compressed and expressed in the same manner as before, "thus exerting at each stroke of the piston a continuous, powerful, and gradual expenditure of power on the piston rod and other motive parts in the reverse way to which they are driven by the momentum until the engine is stopped."

[Printed, 4d. No Drawings.]

A.D. 1865, June 12.—N° 1593.

HIXON, WILLIAM JAMES.—"Improvements in the permanent way of railways, and in locomotives applicable thereto."

According to this invention switches or moveable points are dispensed with in the permanent way of railways, the points of junctions and sidings and of the lines of rails connecting the up and down lines being all fixtures; the improvements in locomotives being for the purpose of rendering them applicable to such fixed system of junctions, points, and sidings. At a short distance beyond each point a grooved or slotted rail is laid down midway between the ordinary rails, and following the curve of the junction across the space between the up and down line, such rail serving "to guide the engine on to and along the points on to another line of rails." In front of the engine is a vertical rod or bar working in a sliding box, the lower end of such bar, when let down into the grooved rail, causing the engine to take the course of the points and to leave the main line in order to run on a junction or branch line, or vice versa. If necessary, a similar guide bar may be applied behind the engine, and also to each of the carriages of a train, and the lower ends of such rods may be furnished with wheels if found expedient. The bars may be depressed and elevated by means of a lever under the control of the engine driver, and chains and levers under the control of the guards.

[Printed, 8d. Drawing.]

A.D. 1865, June 13.—N° 1599.

HOPKINS, WILLIAM JEFFREY. — (*Provisional protection allowed.*) — "An improved force dispeller or spring-buffing apparatus."

In this invention the apparatus employed consists of two parts, "an outer vessel or cylinder containing air, and an inner cone."

" piston, or tube adapted to compress the air. One or more apertures is or are made in either vessel. Upon any sufficient force driving the inner into the outer vessel, or driving the vessels together, the enclosed air is compressed, and the power thus generated is dissipated to the extent required by a portion of the air escaping through the aperture or apertures."

[Printed, 4d. No Drawings.]

A.D. 1865, June 13.—N° 1601.

JOHNSON, JOHN HENRY.—(*A communication from Robert Elsdon.*)—"Improvements in wheels for locomotive engines, railway carriages, and other purposes."

This invention relates to the manufacture of "disc wheels" composed partly of wood and partly of metal, "and has for its object the diminishing the risk of breakage of the wheels." In making a wheel according to this invention "the tyre of the wheel is laid down upon a metal block or bed having a hole in the centre, and turned out so as to correspond with the inside section of the wheel," the main inner portion of the wheel being composed of wooden blocks, suitably shaped, certain safety rings being used to keep the blocks in their places. A tapered mandril is used to force these blocks into recesses in the interior of the tyre, and a certain "bed ring" and a "block ring" are also used in some cases to secure the parts in their respective positions.

The details of the invention are minutely set forth.

[Printed, 6d. Drawing.]

A.D. 1865, June 13.—N° 1604.

GRIFFITHS, JAMES.—"An improved self-acting break for four-wheeled carriages."

This invention is intended to be self-acting, "that is to say, that the break shall be applied to the wheels whenever the carriage descends an incline, and whenever the horses are checked," or, in the case of a railway train, whenever the engine is slackened in speed or stopped. For common road carriages the turn plate for the fore carriage is composed of two circular plates or rings connected by a central bolt, the upper ring being attached by iron loops to the body of the carriage, and the lower ring firmly connected to the under carriage, and by means of springs to the fore axle, the pole or shafts being connected to the lower ring.

So far this invention resembles the ordinary arrangement, but instead of the central bolt merely passing through holes in the turn plates the upper plate is provided with a slot or mortice, so that it is capable of a sliding motion in the direction of the draught as well as a turning motion round the bolt. To the centre of the lower plate is attached or hinged a connecting rod, the latter being also attached to a cross bar carrying two break blocks, a little in advance of the front part of the tyres of the hind wheels. "The result of this arrangement is that as soon as the horses are checked the progress of the under carriage is checked also, whilst the impetus of the body of the carriage carries it still forward, and the upper plate sliding upon the lower (in consequence of the slot or mortice), the tires of the hind wheels of the carriage come in contact with the break blocks, and thus the break is self-acting. It will be evident that in descending a hill or incline the tendency of the carriage to overrun the horses will cause the upper turn plate to slide over the lower, and thus apply the break. A projection from the back of the upper plate serves to support and steady the carriage when the break is on. In order to prevent the break from acting when the horses are backed a stop or bolt is depressed (by means of a treadle or lever) by the driver, so as to fill up the slot or mortice by means of a spring or springs, and the break is then in a position to act as before."

No particular application of the invention to a railway carriage is set forth.

[Printed, 8d. Drawing.]

A.D. 1865, June 17.—N<sup>o</sup> 1637.

HOWES, WALTER, and BURLEY, WILLIAM.—"Improvements in lamps for railway and other carriages, and in connecting lamps to carriages, a part of which improvements may also be applied to handles for carriages."

In applying this invention to lamps the patentees "dispense with the common socket iron, and substitute therefor a semi-cylindrical hollow socket, with a hollow thread cut out a certain distance along the periphery," and fixed to the lamp, and a short arm fixed to the carriage, the outer end of which is formed with a tongue turned upwards at the end, "round which tongue, and solid therewith, a half collar and half screw are formed, terminating with a short length of entire screw; the

"tongue on the arm (or lamp iron) fixed to the carriage fits into the socket fixed to the side of the lamp; the two half screws then form an entire screw, over which a screw collar or nozzle is then screwed," and "the lamp becomes firmly fixed and secured to the carriage." When reaching the lamp the screw collar is simply turned a few turns back till it clears the two half screwed portions of the socket and tongue, but still remaining on the entire screwed portion before mentioned; by slightly lifting the lamp, and at the same time pulling it forward, it is instantly freed from the carriage, and vice versa.

In applying the invention to carriage door and other handles the patentees "make the studs or other fixing media, which are usually formed entire and fixed to the carriage, in two parts, detachable one from the other, one part being formed on the handle and the other on the carriage stud, both being screwed externally, and fixed securely together by means of a collar, as before described."

Different modifications of the invention are set forth.

[Printed, 6d. Drawing.]

A.D. 1865, June 19.—N° 1643.

DEFRIES, HENRY.—(*Provisional protection only.*)—"Enabling the guards of railway trains to pass from one part of a railway train to another."

The inventor in this case proposes "the guard a right of way from one end of a train to the other." The inventor states that by the American plan of carriages "such means is already given," but that all privacy is thus taken from the carriages, and the entrance of obnoxious persons into the carriages permitted. The inventor proposes therefore "to make a sliding door in front and rear of every carriage, with a bridge to be let down by the guard when he requires to pass; this bridge will fall immediately over the buffers on one side of the vehicle," and the arrangement is such that on receiving a signal the guard may open a slide in his own van, drop the bridge to the carriage before him, unlock the slide door of that carriage, which in opening gives indication by means of a bell or otherwise to the passengers that he is about to enter, and thence pass on in the same way to any carriage in the train of which his attendance may be required.

The details of the invention may be variously modified.

[Printed, 4d. No Drawings.]

A.D. 1865, June 19.—N<sup>o</sup> 1646.

SMITH, GEORGE, the younger.—“Improvements in locomotive engines and railway carriages.”

This invention consists, in the first place, of the employment of a certain kind of swivelling truck at each end of an engine or carriage, “combined with intermediate wheels without flanges, for the purpose of enabling engines and carriages of increased length to travel safely over sharp curves, the breadth of the tyre of such flangeless wheels being proportioned to the sharpest curve required to be traversed,” certain “saddles” and segmental bearings being employed in carrying out this part of the invention, of which different modifications are described.

Another part of the invention consists in certain modes of constructing the wheels of engines and carriages. “First, short hollow axles are keyed into the bosses or naves of the wheels, and the solid axles are put through such hollow axles, the bearings resting on the latter,” and the parts being arranged either for outside, inside, or double bearings. Secondly, the bosses or naves are cast separately with arms to them, on to which arms are sprung circular springs, which are compressed either into the collar or the tyre of the wheels. Thirdly, a collar with a shoulder on it is keyed on to the axle of the wheel, and the boss or nave is bored accurately on to the axle of the wheel. Fourthly, this arrangement may have combined with it a spring inserted at the back of the boss or nave, and confined by a plate, so as to admit of the wheel yielding laterally in order to lessen the effects of concussions in a lateral direction. In all the above arrangements plates are bolted to the backs of the bosses, naves, or collars to keep the wheels in their places as well as to allow of self-adjustment when travelling over curves or defective roads. And, fifthly, the wheel is constructed separately, and connected to the back of the tyre, which is grooved by means of either disc or nut plates rivetted or bolted to the spokes or arms of the boss or nave, and having turned-in edges or flanges to be inserted in the grooves of the tyre, such grooves being of sufficient depth to allow of easy play, and to afford elasticity of action and means of adjustment to the tyre.”

The invention is described at some length, and illustrated by a large number of elaborate drawings.

[Printed, 3s. 6d. Drawings.]

A.D. 1865, June 20.—N° 1663.

DUPONT, EMILE.—“An improved system of wheels for railway carriages.”

The wheels constructed according to this invention “are without spokes or arms, the intervening space between the nave and the rim of the wheel being filled up with two circular iron plates or discs, placed parallel to each other, and inserted in the mould in which the nave is cast,” the plates having a number of holes formed therein, “so that upon the metal being run into the mould it passes also through the holes in the circular plates, and the latter are thus, on the cooling of the metal, held firmly in the nave. The tyre which is to surround the circular plates is formed in its inner periphery with a pair of grooves of equal depth, to receive the edges of the circular plates before referred to (formed by preference of sheet iron, and having been turned true on their outer periphery). The tyre is then placed in a suitable furnace, and heated till it is sufficiently expanded to allow of its being slipped round the circular iron plates, the grooves in the former corresponding with the edges of the plates. The tyre is left in this position to cool, and as it contracts the grooves gradually close on to and retain firmly the circular iron plates,” and when the tyre has cooled the wheel is ready for use. In forming wheels of large diameter the patentee, by preference, surrounds the outer edges of the plates by an iron hoop, and places the tyre itself over the latter, “so as to give a greater solidity to the rim of the wheel.” And in those wheels in which the tyre is placed directly over the iron plates or discs, and without an intermediate hoop, the connection of the plates with the tyre is further consolidated by means of screws, which are applied “at the joint at an angle of about forty-five degrees.”

[Printed, *8d.* Drawing.]

A.D. 1865, June 23.—N° 1684.

MURPHY, WILLIAM JEREMIAH.—(*Provisional protection only.*)  
—“An improved apparatus for stopping railway trains.”

According to this invention it is proposed to provide each axle, or one axle of each carriage, with a drum or barrel, which is keyed thereon and has loosely passed around it a strong chain, which is suspended by a band of gutta percha or other material from the



bottom of the carriage. The first and last carriages of the train are, moreover, provided with drums which are loose upon their axles, and the arrangement is such that the chain of one carriage is connected to that of another by a hook or otherwise, forming in effect one long chain passing from end to end of the train, passing loosely once or twice round each fast drum, and the ends being connected to the loose drums already mentioned. These drums are provided with suitable couplings, which may be so acted upon by a lever or otherwise as to be thrown into connection with their respective axles. Thus, upon either of these drums being so brought into connection, a portion of chain will be wound thereon, and will tighten the chain upon all the drums which are fixed upon the axles of the carriages, thus creating an amount of friction upon those drums, which will cause the stoppage of the train. The invention may be modified by dispensing with the drums which are keyed upon the axles, and connecting the chain with breaks of the ordinary character, which will be brought into action by the movement of such chain.

[Printed, 4d. No Drawings.]

A.D. 1865, June 27.—N<sup>o</sup> 1710.

SHAW, HENRY.—“Improvements in the means of and apparatus for retarding the velocity of the wheels of railway and other carriages when in motion.”

This invention consists in the employment of a revolving fan, “which is applied to the running wheels of railway carriages,” and so as “to break the force with which the train is travelling.”

An arrangement is described in which two fans are placed under the body of a railway carriage, and between two pairs of wheels. Each fan is formed of an iron axle, from which plane or curved vanes or sails radiate. The axles of the fan are mounted in sliding bearings, “which fit and move on two horizontal bars,” the ends of which “are made fast to the axle boxes of the running wheels on either side of the carriage, in the same manner as the slide of the present slide break moves, but in lieu of the break block which is used in the ordinary slide break” there is used, according to this invention, “a roller or circular block,” arranged in such a manner that the fan axle in reaching its said bearing passes through the said roller or circular block, and the arrangement being such that

the roller or block is allowed to move up to the running wheel of the carriage and press on its periphery, which it is made to do " by means of a rod from the slide to a short lever and cam shaft, which receives half a turn by means of a step on the " buffer rod which belongs to that slide, so that the slide and " the roller or circular block moves to the running wheel when " the buffer next to that slide is pressed in, and the fans revolve " at a rate depending on the speed of the train. A similar " arrangement is made with each buffer, slide roller, or circular " block and running wheel. The buffers are driven into their " respective bearings by putting on the breaks of the engine and " tender, which when the train is going at a great speed brings " the momentum of the carriages with such force upon the engine " and tender that the buffers of the carriages will be pressed in, " and the fans set to work, but to obviate the case of there being " insufficient compression of the buffers, or that the force may " not be continuous or keep them there, a chain," which the patentee calls chain No. 1, "is passed from a windlass on the " engine or tender under all the carriages until it reaches the end " of the last carriage, where it is hooked on to a hook firmly " fastened into the beam through which the last buffers work. " The chain can be wound up by the said windlass, and so all " the buffers can be compressed, and the fans set in motion."

Another mode of carrying out the invention consists in the application of a chain, which the patentee calls No. 2, and which passes along the train under pulleys on the ends of certain lever rods, and over pulleys on the carriages placed between each of the pulleys on the lever ends, "but situated higher, so that when " the chain is strained tight the levers are raised, and the rollers " or circular blocks do not press the running wheels," this only occurring when the chain is released. Fans may also be fixed outside the two pairs of running wheels, before and behind, and worked in a similar manner to those already mentioned. The effect of these fans may be increased by the employment of shields, so placed as to concentrate the force of the air upon them, thus raising a greater obstacle to their rotation.

[Printed, 4d. No Drawings.]

A.D. 1865, June 28.—N<sup>o</sup> 1718.

FARNWORTH, JOHN KAY.—"Improvements in or applicable " to railway and other carriage windows."

In describing this invention the patentee mentions that in carriage windows of the ordinary construction great inconvenience is felt in opening and closing them. He then states that this invention consists in a novel arrangement of parts for opening and closing carriage windows, and retaining them in any desired position. In order to effect this the patentee makes a vertical slot or opening in the inner panel of the carriage door, the window sliding freely in side grooves. "To a rail or frame fixed to the lower side of the glass of the window is connected a handle or stud passing through the said slot in the panel of the carriage door; to this handle or stud, or to another stud fixed to the said rail or frame, is jointed a catch taking into one or two ratchet racks fixed on one or both sides of the said slot within the panel of the door. The catch is held in gear with the rack by a counterweight, a spring, or otherwise, and when it is desired to lower the window the catch (a projection or arm from which extends through the said slot) is released by hand from the rack. By this arrangement the window can be opened or closed with the greatest facility, and when required partially open the window remains in the position in which it was when the hand released the catch."

One modification of this invention is described as being "particularly applicable to second and third class railway carriages." In this arrangement the ratchet racks and catches are dispensed with, and a certain handle used, which, with the aid of certain studs and other appendages, serves to open and close the window when requisite.

[Printed, 8d. Drawing.]

A.D. 1865, June 30.—N<sup>o</sup> 1736.

FINNIGAN, PATRICK DENIS.—(*Provisional protection only.*)  
—"Improvements in the means applied for arresting and stopping the motion of locomotive engines, trains, carriages, and other rolling stock of railways."

This invention relates to the application of tar, soft-soap, oil, tallow, or other unctuous matter, or all or any of these materials, either alone or in combination, to the wheels of locomotives or other rolling stock, as well as to the rails of railways, "the object being to allow the wheels to rotate while imparting but little motion to the train or carriage," and being also applied to the

rails and wheels of the brake carriage in rear of the train when the brakes are applied, the sand not only giving a powerful hold to the brakes upon the wheels and to the wheels upon the rails, but also clearing the rails from the oily matter which has been applied at the forward part of the train. The oily matter is supplied from small tanks, through tubes connected therewith which are furnished with stop-cocks, the sand passing from a reservoir provided with sluices.

[Printed, 4d. No Drawings.]

A.D. 1865, June 30.—N° 1746.

FAURE, LOUIS.—“Improvements in railway carriages, which “improvements are intended to neutralize the destructive effects “arising from the collision of trains.”

This invention, which is very imperfectly described, consists, in the first place, of two buffers, having long rods, which are mounted upon a carriage sustained by four wheels, this being apparently meant to run in front of a locomotive engine, the latter being also provided with long buffer rods placed in tubes, the rods being surrounded by spiral springs, and the arrangement being such that in case of collision the springs are all brought into action.

The invention may be variously modified, in some case the springs being compressed in their tubes, and kept in position by “a mechanical catch of any known description,” which, being liberated, will allow the apparatus to act, the patentee not confining himself to any particular arrangement of the details of the invention.

[Printed, 8d. Drawing.]

A.D. 1865, July 3.—N° 1759.

NAVEAUX, JOSEPH.—“Improvements in apparatus for stopping “and retarding railway carriages and locomotive engines.”

According to this invention a “combined steam cylinder” is applied to each carriage, and, if desirable, to the locomotive engine of a railway train. This combined cylinder is composed of two parts, which are inclined to each other, there being a piston and piston rod in each, and so arranged that on the admission of steam between the pistons they will be forced away from each other. At the end of each piston rod there is a break, and on

the admission of steam between the pistons each break is forced against one of the wheels of the carriage or engine, the combined cylinder being mounted between the front and back wheels of such carriage or engine, and the apparatus being applied at both sides or at one side only thereof. On the steam being allowed to escape from the cylinder, when the breaks are no longer required to act, the pistons are forced back into their first positions by springs. The outer ends of the cylinder are open, but a bar passes across each, through an opening in which the piston works. Steam for working the breaks is supplied from the boiler of the locomotive, a pipe passing thence which is furnished with a cock which is at the command of the engine driver, and the carriages being supplied with pipes, which by means of flexible junction pipes form a continuous pipe extending the whole length of the train, the cock already mentioned serving for the admission of steam to the combined cylinders of the train, while a second cock placed further from the boiler than the first serves to discharge the steam from the cylinders on the closing of the first cock. A discharge cock may be fitted to each cylinder for the escape of condensed water, or this may be effected by means of a groove in each part of the cylinder, which is so arranged that when the pistons are pressed backwards by the springs the water may escape by such grooves. Instead of the break blocks being connected to the piston rods they may be acted upon by the latter through the medium of levers or otherwise.

[Printed, 8d. Drawing.]

A.D. 1865, July 4.—N<sup>o</sup> 1769.

WILSON, JAMES EDWARDS.—“Improvements in locomotive engines, and in springs of railway carriages.”

According to one part of this invention four pairs of wheels are applied to a locomotive engine, but more than four pairs may be used, the patentee stating that in some cases it will be desirable to use more than four. The wheels are meant to be coupled by crank pins or cranks, and in order that an engine so furnished may, notwithstanding its length, pass freely round curves, the forward and hinder axle boxes have a short play between their horns, so that the forward and hinder axles can move endways with their boxes a short distance. Certain arrangements connected with the fire-boxes of the engine are also described.

As regards springs for railway carriages, "in order to render them more suitable for varying loads, flat straight bars, by preference of tempered steel, are used, and they are so arranged that when there is a light load in the carriage only part of the elastic bars come into action, and consequently present the desired elasticity, more and more of the elastic bars coming into action to support the load as it becomes greater and greater. Between the succeeding bars constituting the complete spring, and near the ends thereof, are blocks having between them and the next elastic bars spaces sufficient for the elastic play of the bars, which receive and support the load, but as the weight of the load becomes greater and greater the first bars which receive the load come in contact with the blocks between them and the next elastic bars, and are supported thereby and by the elastic bars by which the blocks are supported, and so on till all the elastic bars come into action."

Different arrangements of these springs are set forth.

[Printed, 2s. 4d. Drawings.]

A.D. 1865, July 10.—N° 1821.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Joseph Alphonse Loubat.*)—(*Provisional protection only.*)—"Improvements in steam carriages, and in adapting wheels for common roads to railways."

According to this invention the power of the engine "is transmitted by a chain to the driving axle, which is provided for the purpose with a chain wheel, and is straight instead of being bent or cranked." The back wheels are sustained by a moveable carriage, "which permits of their turning on a poll bolt;" and steering apparatus is fixed at the front and at the back to guide the carriage according to the curves of the road. Shocks arising from collisions are deadened by caoutchouc packing or springs interposed between the frame of the body and the frame which supports the compartments for the passengers or goods.

"The driving power is at the front of the carriage, and is by preference composed of two coupled steam cylinders, receiving their steam from one generator," the pistons of these cylinders giving motion to certain cranks, chain wheels, and chains, which, in conjunction with other mechanism, give to the wheels of the carriage the necessary direction.



"A similar steering apparatus may be fitted to the rear of the carriage. The driving axle is mounted on bearings, and the position can be regulated according to the tension of the chain," and in order to allow the carriage to run upon rails the patentee bolts to the tyre of each wheel segmental bands, so as to form a flange. "When the carriage is intended to run on ordinary roads the flange is removed," and the patentee mentions that this method of adapting common road wheels to railways is applicable both to steam and other carriages.

"The turning of the carriage on a poll bolt" may "be produced by gearing and an endless screw."

[Printed, 4d. No Drawings.]

A.D. 1865, July 15.—N° 1860.

WALKER, JOHN CRAWFORD.—(*Provisional protection only.*)—

"Improvements in the construction of springs for railroad and other carriages."

This invention consists in providing for each spring an upper and lower cylindrical cast-iron box, the lower box being open at the upper end and the upper box open at the lower end, the latter being smaller than the former, and capable of entering into and playing up and down therein. The lower box is partially filled with old india-rubber springs, or discarded india-rubber of any sort, cut into small pieces of irregular size, mixed, in order to prevent solidification, with small pieces of hemp or sponge; and the upper box is nearly filled with wood or with india-rubber and hemp, or some other material, and then placed with the lower end downwards, within the lower box, resting upon the filling of the latter, the two then forming a spring which may be applied as a bearing spring for railway purposes, such springs being also applicable to common road carriages and the carriages of artillery.

[Printed, 4d. No Drawings.]

A.D. 1865, July 25.—N° 1924.

RIGG, JOHN.—"Improvements in the construction of railway carriages."

This invention consists in forming a connection from end to end of a train by means of a corridor running along one side or through the centre of each carriage, and connected from carriage to carriage by means of telescopic slides and flexible diaphragms.

or otherwise. Each compartment of the carriage is separated from the corridor by doors, sliding, or otherwise suspended. The ends of the carriages are or may be closed by means of doors, and there are also, if required, sliding doors to shut across the corridor, to separate the classes of passengers or for other purposes; these corridors affording access to water-closets and other conveniences provided for the use of the passengers.

In every train one carriage is provided with a water-closet and lavatory for ladies, similar conveniences being also provided for gentlemen, placed by preference in a different part of the train, the patentee mentioning that in mixed trains the ends of the corridor of each class of passengers may be closed by doors. The second and third class passengers are also provided with conveniences of the same character, the corridors forming a complete communication from one end of the train to the other, and among other purposes, facilitating the employment of speaking tubes and other modes of communication between the passengers and the guard.

[Printed, 10d. Drawing.]

A.D. 1865, July 28.—N° 1954.

KING, WILLIAM.—(*Provisional protection only.*)—"Improvements in apparatus for retarding the progress of railway carriages and trains."

This invention consists, firstly, in applying to the top of a railway carriage a "wind plate" of wood, or other suitable material, so jointed thereto as to be capable of either lying upon the carriage or standing upright; being placed across the carriage, and having connected thereto an arm and levers, which by means of a certain rod may be acted upon by the guard, who may thus raise or depress the wind plate at pleasure.

Secondly, in jointing to the wind plate rods, which pass down the end and near the sides of the carriage, these rods being connected by means of levers to breaks, which, when the wind plate is raised, are brought into contact with the wheels of the carriage; both wind plate and breaks thus acting simultaneously in retarding the progress of the carriage.

[Printed, 4d. No Drawings.]

A.D. 1865, July 28.—N° 1959.

MITCHELL, ROBERT BRIGHTMORE.—"An improved break for railway and other wheeled carriages."

"The object of this invention is "to construct a self-acting break  
" in such a manner that it shall act automatically upon the  
" wheels whenever a check is given to the engine, horse, or other  
" tractive power employed. The power used is the natural  
" tendency of any moving body to continue in motion, and the  
" increasing momentum of any wheeled carriage in descending  
" inclines, and the same in case of reductions of speed and sudden  
" stoppages."

In applying the invention to a carriage for common roads with more than two wheels the patentee divides the carriage from the bed or beds, and affixes between and thereto one, two, or more slides or rollers, one portion of each of such slides or rollers being bolted, screwed, or nailed to the body or upper part of the carriage, and the other part being fastened to the bed or beds as aforesaid, "so that the one part may have a sliding or rolling motion upon the other." If a tubular slide is used the rod is made longer than the hollow part, and in the case of rollers in frames, the frame of the roller is made longer than the usual traverse of such rollers.

In applying this break on such slides or rollers, being fixed, the patentee attaches or hinges the common break ironwork to the under part of such slides or rollers, or to the bed, instead of adopting the mode usually practised of fixing them to be worked by the hand or foot, and therefore "instead of the carriage pressing upon the motive power the body, contents, and the hinder wheels slip or roll forward upon the slides or rollers, and therefore put on the breaks as in case of hand or foot power. The body and hinder wheels, therefore, have a backward and forward motion of the distance required to work the breaks, but are not allowed to slide or roll to the full extent of such slides or rollers, as in that case the power thereby obtained would be lost." These arrangements may be variously modified, the patentee mentioning that in the case of a carriage with two wheels only, he counteracts the present effect of hand or foot breaks in throwing extra weight upon the horse's back by placing a "hand or foot break-work" so as to move the body of the carriage back a short distance before allowing it to slide or roll forwards in applying the breaks to the wheels. In applying the invention to a railway carriage, the patentee allows the body or upper portion of such carriage to slide or roll upon the under portion, having slides or rollers on the whole or part of the length of the carriage,

and the usual railway carriage breaks applied thereto, as in a road carriage. If found requisite, springs may be applied to the slides, so as to assist in throwing the breaks off as soon as the engine commences to draw, and if these springs are made of the proper strength they will also prevent the breaks from being applied when the engine is backed. "In backing any carriage, if it should be required, a handle or foot treadle is applied, and so connected with the break as to work in a similar manner to the common break handle or treadle, to put the break on and off in cases of horses running away or other derangement of the usual speed of the motive power," such connection or handle being also capable of being so applied that the break can be reversed in its action, "and therefore in a railway carriage that shall be proceeding the one way, the break shall be in a state ready for action when required;" "the same effect may be obtained in railway carriages by a buffer or buffers, or similar arrangement, in connection with the engine driver or guard."

The patentee mentions that the great advantage of this invention is, that "the break cannot be in action when the motive power is drawing or proceeding at the same speed as the component parts of the carriage to which the break is attached, the force of such break being regulated by the requirements of the motive power, the momentum of the carriage, and other natural causes."

Different modifications of the invention are described.

[Printed, 8d. Drawing.]

A.D. 1865, July 29.—N<sup>o</sup> 1964.

SABEL, EPHRAIM.—(*A communication from Martin Dieudonné Henvaux.*)—"Improvements in the manufacture of iron and steel."

This invention consists "in a new system of cylinders or rolls by which every description of bar iron may be manufactured in a single frame or cage, that is to say, by a single set of rolls, without separate roughing rolls, directly from their faggots and at a single heat," the invention being also applicable in the manufacture of steel. This system "is composed of two distinct parts; the first comprises rolling with two rolls, and the second rolling with three rolls," but in both cases the system consists "in placing on the same rolls all the necessary grooves for

" roughing and finishing the faggots, and consequently the bars, " without requiring separate roughing rolls in the manufacture " of flat bar iron, round or rod iron, square bars, angle-iron, and " other ordinary iron by the two roll system," separate roughing rolls being, however, required for rails, girders, and other iron of large dimensions, and this constituting the improved three roll system, in which, as mentioned above, but a single set of rolls is required for every sort of bar iron up to large girders of 1 foot in height, and round iron up to 10 inches in diameter, " which no " ordinary rolling mill could manufacture under existing circumstances."

The details of the invention are set forth at great length and under different modifications, one of the latter being applicable to forming the tyres of wheels. In this case the faggot is first operated upon by four grooves in succession " flatwise," being then rolled on edge in two other grooves to give it a certain breadth, and then passed through four other grooves, by the last of which it is finished. The invention, however, is described mainly with reference to the formation of rails, bars, and rods.

The arrangements for rolling the tyres of wheels are illustrated more especially with reference to flanged tyres suitable for railway wheels.

[Printed, 6s. 3d. Drawings.]

AD 1865, July 29—N° 1969.

SWINBURNE, JOHN, and LAMING, JAMES. — " Improve-  
" ments in means or apparatus for stopping or retarding railway  
" carriages."

According to this invention there is fitted to each carriage of a railway train an air or other fluid pump, and piston, and reservoir. The piston or plunger of such pump is worked by an eccentric cam or tappet motion from the axle or wheels of the carriage, so as to force the air or other fluid into the reservoir, where the pressure is regulated by a safety valve, and air thus compressed is allowed to pass by means of a valve which is at the command of the driver, stoker, or others, into a cylinder, provided also with a piston, which piston is thus caused to pass from one end of the cylinder to the other, the rod of the piston being connected by levers or chains to band or other breaks, " in order to act upon

"several wheels of the carriage at once." The communication between guard, driver, or "stoker consists simply of a line or rod," actuated by levers or a lever at certain places, "and by the movement of these levers an instantaneous resistance is placed on every separate carriage. The rod has on each separate carriage a small lever to open the valves or cocks in order to let the air or fluid escape from the reservoirs to the pistons of the cylinders, and thus cause the traverse of the pistons with the rods thereof connected to the chain or levers acting on the breaks or otherwise. From each valve or cock is passed a rod to the top or other part of the carriage, and to a lever or pulley of each carriage, and through the end of such lever a line is passed, when the driver, guard, or others in charge may each in their undivided capacity apply the break power when required. If the rod or bar is used, sliding or other suitable and readily connected or detached joints are applied between the carriages." If the line is applied, simple spring hooks may be used between such carriages, and thus, when it is requisite to divide a train, or apply additional carriages thereto, the break apparatus may be readily adapted accordingly.

Instead of all the breaks of a train being applied simultaneously, they may, if preferred, be brought into action successively, and an index may be so arranged in connection with the apparatus as to show the amount of power applied to the breaks, as well as to sound a gong or other signal.

[Printed, 10d. Drawing.]

A.D. 1865, July 31.—N<sup>o</sup> 1975.

RAMSBOTTOM, JOHN.—"Improvements in the manufacture of hoops and tyres, and in the machinery employed therein."

This invention relates, in the first place, to certain improvements upon an invention for which a Patent was granted to the present patentee on the 7th of January, 1864, Number 48, and consists in an improved mode of dividing the ingots described in the Specification of the said Patent, "so as to reduce the waste." The ingots are cut into discs by means of circular saws, as in the first invention, but the quantity of metal removed by the saws is reduced by forcing into the circumference of the ingot, whilst it is being rotated on its axis, a revolving disc or discs by which annular grooves are formed, and the diameter of the parts to be



sawn is rendered smaller. If desired the grooves can be made so deep that the ingot can be divided without sawing.

Another part of the invention consists in the use of round-ended taper punches, in lieu of the flat-ended punches described in the Specification above referred to, "in order to perforate the disc without removing any portion of the metal."

Another part of the invention consists in producing ingots of such a form that they may be converted into discs, and consequently into hoops or tyres, without the loss of any portion of the metal excepting that resulting from oxidation. For this purpose the ingots are cast of a conical or pyramidal form, with a portion of the apex removed, and of such a taper as to admit of being flattened into discs by hammering or compression in the direction of their axes. Or instead of making the ingots pyramidal or conical they may be made hemispherical, bell-shaped, or of "other conoidal form which will admit of the whole being compressed into the disc."

Another part of the invention relates to the use of a revolving plain taper mandril, or a mandril with longitudinal grooves, for expanding hoops such as described in the Specification of the Patent granted to the present patentee on the 25th of May, 1865, Number 1425, and "applying pressure rollers placed on opposite sides or around, to force the hoop on the mandril."

The last part of the invention relates to a mode of manufacturing hoops for boilers, and consists in making from cylindrical ingots or ingots of a form approaching thereto thick hoops, which are gradually increased in diameter and length until of sufficient size to be finished in a rolling mill.

The details of the invention are set forth at some length, and under different modifications.

[Printed, 2s. 6d. Drawings.]

A.D. 1865, August 2.—N° 2005.

PETITJEAN, WILLIAM HENRY, and McNALLY, EDWARD.—(*Provisional protection only.*)—"Improvements in the construction of railway carriages, and in railway breaks and signals, part of which is applicable to marine purposes."

One part of this invention consists in "making high doors with windows between the compartments of railway carriages," such doors being "placed in the middle of the carriage" and

reaching "from the seat to the roof, or thereabouts," the windows being covered with curtains. Thus in case of danger or attempt at violence a person in one compartment may call the attention of passengers in the adjoining compartments by striking the door or breaking the window, and should the door be fastened it may easily be broken through to afford access to the compartment to which attention has been directed.

Another part of the invention consists in making the foot-boards of carriages to project beyond the ends thereof, and placing handrails "all along the carriage excepting at the doors," and also projecting beyond the ends, to assist a guard or other person in moving along the train when in motion.

Another part of the invention consists in an improved combination of gearing and springs "for accumulating power to press the " break blocks against the wheels when it is desirable to retard " or stop a train of railway carriages. On the tender or in the " guard's van is a shaft, with a worm gearing into a wheel, the " boss of which forms a nut taking into a screw on a horizontal " shaft, the ends of which are coupled by a double swivel hook " or other suitable coupling to a similar shaft attached to the " adjoining carriages. The breaks are connected as usual to a " rocking shaft to which is fixed a lever which is held on one side " by a stop piece connected to the horizontal shaft, and the other " side of lever is acted upon by a spring which abuts against a " shoulder fixed to the horizontal shaft." The arrangement is such that by turning round the worm and wheel the spring is brought into a state of tension, and made to apply the breaks to the wheels on the movement of a lever which causes the stop piece to liberate the lever on the rocking shaft.

Another part of the invention relates to signals, which are applicable not only to railway trains but on board ship, or for lighthouses, or other marine purposes, but this part of the invention will be noticed in another series of Abridgments.

[Printed, 4d. No Drawings.]

A.D. 1865, August 4.--N° 2028.

BONNEVILLE, HENRI ADRIEN. — (*A communication from Edouard Chollet.*) — (*Provisional protection only.*) — "Improvements in the construction of axle-boxes and bearings."

The object of this invention is "the transformation of the

" sliding friction into a rolling friction in axle-boxes and bearings  
 " of railway and other carriages, and of the shafts of screws and  
 " machinery in general."

An arrangement is described in which the ordinary bearing of a railway axle-box is replaced by a wrought-iron or steel collar or ring, which is of much larger internal diameter than the journal of the axle, and in fact hangs therein, this collar or ring being lined with a coating of bronze. Within such collar or ring is placed a roller, flanged at each end to keep it in its place, and through this roller passes a fixed shaft, which serves as the axis of the roller, the ends of this shaft passing through the two sides of the axle-box, and the latter, with its load, thus being sustained by the ring or collar and the roller, the ring rotating as the axle revolves, and causing also rotation of the roller. At the outer end of the fixed shaft is an oil cup, from which oil may be passed along a groove or conduit formed in the shaft, and to a cotton wick by which it is distributed inside the roller. The springs of the carriage are placed on the top of the box.

[Printed, 6d. Drawing.]

A.D. 1865, August 5.—N<sup>o</sup> 2036.

**GEERING, HENRY.**—(*A communication from Thomas Tunnington.*)

—" Improvements in the sackings of metallic and other bedsteads,  
 " sofas, couches, and other like articles, which said improvements  
 " may also be applied to the seats of chairs, railway carriages,  
 " and other articles."

This invention is described, in the first place, "with reference to  
 " an elastic sacking for a bedstead." And in carrying out the  
 invention the patentee takes a strip or lath of wood or metal of a  
 length nearly equal to the breadth or length of the bedstead with  
 which the sacking is to be used, and near either end of the said  
 strip or lath he fixes a metallic clip or band, the upper side of the  
 said clip entering a groove or recess in such lath. To the lower  
 part of the clip is fastened one end of an elastic band or web, the  
 other end of such band or web carrying a hook by which it is  
 connected to the side or end rail of the bedstead, such hook  
 engaging in holes in the said side or end rail. "The elastic band  
 " or web is connected to the metallic clip at either end of the  
 " strip or lath in the following manner:—The metallic clips are  
 " made of a depth somewhat greater than the thickness of the

" strip or lath, the lower side of the said clip being made much broader than the upper part, by which it is hung to the strip or lath. The inner or upper face of the lower part of the clip is inclined to the plane of the strip or lath to which the clip is connected. In fastening the elastic band or web to the clip, the doubled end of the band or web is placed between the lower side of the clip and under side of the strip or lath, and drawn forcibly between the said parts. The said doubled part of the web or band is thereby wedged between the said clip and strip or lath, and fixed firmly in its place. When the elastic band or web is expanded the upper part of the clip swivels or turns slightly upon the strip or lath as a centre, and contracts the space between its lower side and the strip or lath; and thus the more the band or web is pulled and expanded the tighter its end is wedged between the clip and strip or lath."

After thus describing the invention as applied to a sacking for a bedstead, the patentee states that the application thereof to the seats of railway carriages and chairs does not differ in any essential respect from the arrangement set forth.

[Printed, 8d. Drawing.]

A.D. 1865, August 5.—N° 2037.

SMITH, THOMAS, and BROOK, JOHN.—"A self-acting coupling for carriages and wagons."

According to this invention the patentees substitute, in place of the ordinary screw and links, or hook and links, one hook of flat bar iron, "by preference about eight or ten inches deep, working on the draw bar as a fulcrum. A spring connected to the buffer beam presses against the back of the hook," and on the same centre as the hook is connected "one end of a lever handle, the outer end of which extends without as far as the side beam of the carriage or wagon, and rests upon a quadrant affixed to the vehicle, having one or more catch notches or catch pins to retain the hook, either coupled or the reverse, as circumstances may require," the patentees stating that by means of this handle they can "uncouple with ease any wagons or carriages when the buffers impinge," while on the other hand, "in consequence of the spring placed behind the hook, and the curve given to the back of the head of the same in forging, when two carriages or wagons are brought together they couple together without any extraneous assistance.

These arrangements have reference more especially to wagons for the conveyance of goods, "and where the draw bar is secured by means of a nut and washer to the cross beam. Where, however, as in the case of passenger carriages, springs are connected within the framework to the draw bars, the ends of the springs abutting on shoes secured to the buffer rods (in the well-known manner), a modified arrangement is necessary." In such case the patentees place underneath the framework of the vehicle, "and in proximity to the back of each draw spring, a cross shaft at right angles to the sole beam" of such vehicle, and having small winch pulleys keyed upon its outer extremities without the sole beams. Suitable brackets are secured to the inner sides of the sole beams, adapted to receive the bearings which carry the cross shaft, such bearings having a V section within the brackets, and being free to traverse horizontally. "Upon each of the cross shafts is keyed or otherwise secured a worm, which gears into a worm wheel above it on the draw bar. The inner end of the draw bar passes through a hole made through the centre of the spring, as well as through a clip 'box' bracket secured through the centre or thickest portion of the spring. A thread is chased upon the inner end of the draw bar, and likewise a corresponding female thread within the centre part of the worm wheel before spoken of, such worm wheel being placed within the box part of the clip box bracket, also before named. The outer end of the draw bar has a flange forged upon it to receive the pressure of a 'toe' forged upon the lunge part of the hook." In this arrangement the small spring behind the hook is secured by preference to the draw bar instead of to the buffer beam, the quadrant requisite in the first arrangement being here dispensed with.

[Printed, 1s. 10d. Drawings.]

A.D. 1865, August 7.—N° 2045.

MEAD, JOHN.—(*Provisional protection only.*)—"Improved means or apparatus for retarding or stopping railway carriages and trains."

In this invention, instead of applying break power to the wheels of railway trains, the inventor mounts a lever or levers on the engine and each of the carriages of a train, such levers being connected together by a rope, chain, coupling, or other contri-

vance, in order that they may all be acted upon simultaneously, either by the guard or driver of the train, so as to cause the ends of the whole series of levers to act with great pressure upon the permanent way of the railway, and thus resist the progress of the train. Upon the permanent way of the railway is laid a suitable surface, by preference of wood, for the ends of the levers to act upon, the latter being furnished with blocks of wood or other frictional surfaces. The levers of adjoining carriages may be connected together by suitable coupling bars, and brought into action "by suitable gearing, as is well understood." These levers are meant to lift the carriages from the rails.

[Printed, 4d. No Drawings.]

A.D. 1865, August 11.—N° 2082.

MORGAN, RICHARD DOUGLAS.—(*Provisional protection only.*)  
—"Improvements in the couplings or fastenings of railway carriages or trucks."

According to the first part of this invention the ends of the draw bars of railway carriages or trucks are furnished with loops in place of the ordinary hooks, such loops constituting additional buffers if required, but not projecting as far as the outside buffers, the loops of two adjoining carriages meeting opposite each other within a certain distance. The draw bars are also provided with projections, there being a hole through each for the passage of a rod which supports a lever catch or clamp, and such lever catches or clamps being moved up and down at pleasure by handles at the ends of the rods, which project beyond the framing of the carriage. Thus when the handles are moved into a vertical position the catch of one carriage enters the loop of that next behind it, while the catch of the hinder carriage enters the loop of the first, a double connection being thus formed, which may at once be severed by moving the handles downwards, and will also be severed in case of either carriage leaving the rails "by the consequent jerk."

These arrangements admit of carriages being coupled and uncoupled without persons passing between them.

[Printed, 8d. Drawing.]

A.D. 1865, August 11.—N° 2086.

STEPHENS, THOMAS ENGLISH.—"Improvements in and applicable to railway carriages, to enable passengers to pass from



"one compartment to another, and to give signals on trains in motion."

According to one part of this invention the patentee converts "the whole or part of the said carriages into compartments capable of being moved." He states that in practice "it is convenient to make only a portion or pannel of such partitions so as it can be moved, say, made to slide in grooves or in the manner of a window sash, and of such a size that a passenger deeming it expedient or finding it necessary to pass from the compartment in which he or she may be into a next compartment may be enabled to do so with ease. When one of these pannels is moved a given distance, it may be downwards and partly through the bottom of the carriage, spring and other catches secure it, and it can only be returned or closed by the guard or other official in possession of a suitable key. At the time the said pannel is being moved it comes into contact with "and gives motion to a lever," which is in connection with certain signalling apparatus.

One end of this lever, on the latter being moved by the pannel, is made to approach one of the axles of the carriage and bring into contact therewith a friction pulley or roller, which is thereby caused to rotate and put in motion a pulley or wheel carrying a belt, cord, or chain, or a crank or eccentric, by either of which means signal apparatus may be brought into action, such apparatus being of any kind which it may be desirable to use, the patentee stating, however, that there are two kinds which he prefers to use, the first consisting of flags or arms, and the second of rockets, the method of using each of which is set forth. This part of the invention, however, will be noticed in another series of Abridgments.

[Printed, 1s. 3d. Drawings.]

A.D. 1865, August 12.—N<sup>o</sup> 2090.

**KNOWLES, JAMES.**—"Improvements in machinery for lubricating the axles of colliery and other similar waggons or trucks."

According to this invention "foundation plates" project downwards from the tram rails on which the waggons or trucks travel, and to cross bars connecting these foundation plates are fixed uprights which support four troughs or vessels for the

reception of lubricating matter, there being also fixed to the same cross bars the bearings of certain shafts, and also certain guide plates. To the outer ends of these shafts are fixed levers, to the upper end of each of which is jointed a weighted lever, the longer arms of these levers dipping into the lubricating material when the apparatus is used, and conveying on rising a portion of the lubricant to each axle of the waggon or truck, the guide plates having curved slots in them into which pins projecting from the levers take, and the movements of the latter being thereby directed. The whole apparatus is brought into action by means of certain toothed segments and an upright rod, the latter being depressed by an attendant when it is desired to lubricate the axles of a waggon or truck, which for that purpose is brought into a suitable position over the apparatus. The foundation plates also carry another shaft, on which are mounted catches and a weighted lever, to which is jointed another upright rod, by the movement of which the attendant can cause the catches to stop the waggon or truck the axles of which it is desired to lubricate, and to release it after the operation.

The details of the invention are described at some length, and embrace the employment of certain curved guide rails, which direct the waggon or truck so as to bring it precisely over the apparatus, and also a certain "guard," which is so arranged as to arrest the motion of any waggon or truck which may have a bent axle or other projecting part which might injure the working parts of the apparatus, this guard also serving partly to remove dirt from the axles.

The invention may be modified by dispensing with the catches for stopping the waggon or truck, and mounting the lubricating apparatus upon wheels, the arrangement in this case being such that the apparatus may move for a short distance along with the waggon or truck being operated upon, which renders the stoppage of the latter unnecessary, the apparatus being afterwards brought back to its original position by a weight, and a chain passing over a pulley, or other suitable means.

[Printed, 10d. Drawing.]

A.D. 1865, August 21.—No 2154.

SHAKESPEAR, WILLIAM. — (*Provisional protection only.*)—

"Improvements in apparatus or mechanism for stopping or retarding railway trains."

In this invention there is passed round one of the axles of a railway carriage or waggon an endless chain, which passes also round a pulley mounted on a transverse beam which forms a portion of the framing of such carriage or waggon, there being on the axle of the pulley a pinion with which a rack may be placed in or out of gear, such rack, when so placed in gear, actuating a double lever, and so pressing brake blocks in different directions, apparently for the purpose of pressing them against the wheels of the carriage or waggon. "The rack is released from the above-named pinion by an excentric motion under the control of the guard or other attendant, and is brought back into its proper position by means of a spring of steel, indian-rubber, or other elastic material," and any number of carriages "may be connected together by means of a longitudinal bar with square socket joints, the longitudinal bar in each carriage being connected with the excentric and the other portion of the mechanism as above mentioned, but actuated from one brake van only."

[Printed, 4d. No Drawings.]

A.D. 1865, August 22.—N° 2159.

ROBINSON, FREDERICK CHARLES BRYAN.—(*Provisional protection only.*)—"Improved safety couplings for railway carriages."

In this invention, instead of the ordinary fixed hook attached to the end of the carriage a tumbling hook mounted in the outer end of a bar is used, the other end of which bar is pivoted to the draw bar of the carriage, the hook being retained in "a holding position" by a fixed detent, lying over the tail of the hook. The ordinary coupling chain being placed upon this hook is securely held so long as it pulls in a nearly straight line, but in the event of its pulling sideways, as, for example, in the event of a carriage leaving the rails, the tail of the hook is drawn from under the detent, the hook turns over, and releases the coupling chain therefrom, thus disconnecting that carriage from the rest of the train.

[Printed, 4d. No Drawings.]

A.D. 1865, August 26.—N° 2192.

HAZELDINE, FREDERICK.—"Improvements in the construction of vans, waggons, or carts employed for transporting furniture and other goods on common roads and railways."

This invention consists in "substituting wrought-iron lattice-work, or a combination of iron and woodwork on the girder and tension principles, in place of the ordinary wooden framing at present employed in the construction of vans, waggons, or carts, and in covering the roof thereof with corrugated metal (zinc, by preference), also tarpauling, macintosh, or other suitable material, and the sides, back, and front with mahogany or other wood panelling or boarding, arranged diagonally instead of longitudinally, as commonly practised; and, further, in arranging or disposing the rods employed to form the sides of the vans, waggons, or carts, either in parallel lines to each other or diagonally, upon the tension principle, to the bottom sides of the vans, waggons, or carts."

The patentee states that by these improvements vans, waggons, and carts may be made considerably lighter, much more durable, and capable of being more easily repaired than those constructed in the ordinary manner. And he describes an arrangement in which tension rods are sustained by wooden uprights forming part of the framework of the sides of the van, the arrangement being such that "the expansion of the wood shall operate so as to pull the middle portion of the sides of the van inwards, and the bottom thereof upwards," the lowest of the tension rods being formed in two parts, in order to accommodate them to curved pieces within which the hinder wheels of the van work.

[Printed, 6d. Drawing.]

A.D. 1865, August 30.—N° 2227.

GREEN, JAMES COLLE.—"The improvement of the permanent way of railways, and carriages for the same."

That part of this invention which relates to carriages for railways, and which is also applicable to engines and trucks, consists "in providing each engine, truck, or carriage with double-flanged wheels," each wheel having a flange upon the outside as well as upon the inside of the tyre, the object of this being to prevent accidents in case of any of the rails being broken, left loose, or being entirely out of place. A sufficient space is left between the flanges to "prevent any additional friction by the use of the outer flange," so that "it will not diminish the rate of speed, but will be a complete security against accidents" which might result from any of the causes mentioned above.

These double-flanged wheels are mentioned as constituting the "special characteristics" of the invention, and the inventor states that he does not confine himself "to any special mode of putting on the double flanged tyre to the wheels. It may be done in one or more pieces of iron or steel. The outside may be made separate from the inside flange, bolted to or fixed upon the wheel by clips or other means, either new or old wheels, "or it can or may be made of one double-flanged tyre."

That part of the invention which relates to the permanent of railways, and which is set forth at some length, will be found in another series of Abridgments.

[Printed, 1s. 6d. Drawings.]

A.D. 1865, August 30.—No 2232.

WRIGLEY, THOMAS, and WESTHEAD, MARCUS II

"An improved method of retaining and preventing the sliding of windows used in dwellings, and in railway vehicles, and for an improved apparatus for effecting the same purposes."

This invention is designed, firstly, for the purpose of retaining carriage windows in any position into which they may be placed; secondly, for the purpose of preventing the vibration of doors, or panels, "and also for retaining and locking the sashes thereof when partially open."

The improvements consist mainly in the employment of a disc or roller of india-rubber or other suitable elastic material having an aperture through its centre which is furnished with a bush or eyelet, and the latter being placed upon a pin or screw carried by a bracket which is attached to the carriage window framing, in such a manner that the periphery of the disc shall be in contact with and shall be caused to exert pressure upon the window or framing. "Thus when the window is raised or lowered the said disc or roller will revolve with a small amount of friction, until the window ceases to be moved by the hand, at which time the pressure exerted upon by the india-rubber will retain the window in the position in which it was left." The brackets and revolving discs may be variously arranged. One arrangement is described in which the inside of a carriage door is provided with two brackets

on each side, each having a roller or disc which bears against the frame of the window, other rollers or discs fixed to the framing of the door, near the top of the window, preventing vibration of the latter when closed. In some cases the brackets are provided with breaks, which, by means of screws, may be forced against the discs or rollers and so prevent them from revolving, allowing the window to descend after being partially opened, these breaks, however, being only meant for use when a carriage is passing over a rough road and subjected to unusual shaking.

In dwelling houses the brackets may be secured either to the bottom or top sash of a window, "in such a position that the india-rubber shall exert a slight pressure upon the opposite sash or frame to that to which it is connected, or the bracket with its disc may be arranged and adapted in any suitable manner or position to a window so as to counteract vibration. In some cases a lever or catch may be attached to or connected with the roller or disc fixed on one window frame, and be used in combination with a recess on the other window frame, so that when the catch is placed in the recess the window will be locked thereby, and when partially opened it may be secured in any required position, and so offer resistance to the window being moved by any person from the outside."

The invention may be variously modified, in some cases elastic cushions and screws, or levers moved and secured by strings, loops, or rings, being used instead of the discs or rollers, while in other cases, a roller made of hard material is made to press against an elastic surface on the frame of the window.

[Printed, 8d. Drawing.]

A.D. 1865, August 31.—No 2238. (\* \*)

COWPE, EDWARD, and HANCOCK, DAVID.—"A new or improved method of and apparatus for applying electro-magnetism as a break power on railways."

This invention "consists of an improvement on and an addition to" No. 101 (A.D. 1865).

"In the specification of the aforesaid patent, we stated that the magnets should be applied to the wheels themselves or to plates attached thereto, now, according to this our present invention we fit the magnets in a frame," "capable of receiving a to-and-fro motion within certain limits, but instead of fixing the said frames as therein described in a horizontal position, we



" now place them in a vertical position, and in such manner that  
 " the magnets are suspended above the line of rails or permanent  
 " way on which the train runs. Power is applied from the break  
 " van or tender as before, but the magnets, instead of acting  
 " upon the wheels, in this case drop and act against the rails."  
 This invention may either be used alone or in conjunction with the  
 former apparatus.

The drawings show a battery in the "break van," the two poles  
 of which are united by means of a dial, "so that according to  
 " the direction in which the handles are moved, so the power is  
 " applied and withdrawn."

" In order to effect a communication from the break or guard's  
 " van to other carriages," "we fit to the ends of each carriage  
 " two spring buffers of unequal length." These buffers carry at  
 their ends metal buttons secured to rods, "which are united to  
 " the wires in connection with the magnets and battery in the  
 " break or guard's van."

[Printed, 10d. Drawing.]

A.D. 1865, August 31.—No 2250. (\* \*)

WARD, JOHN.—(*Provisional protection only.*)—"Improvements  
 " in the means of fixing or attaching the bobbins of winding and  
 " other machines on to their spindles, which improvements are  
 " also applicable to other similar or analogous purposes, and  
 " to the detaching of railway carriages from trains whilst in  
 " motion."

The inventor says:—"The spindle of a winding machine is  
 " usually made with a screw thread at one end, and when the  
 " bobbin is placed on the spindle a nut is passed on to this screw  
 " and screwed up to the head of the bobbin, so as to hold it  
 " firmly on the spindle. My invention is designed to dispense  
 " with this screw and nut for such and similar purposes. In  
 " carrying out my invention I leave the spindle smooth and of the  
 " same diameter throughout its length, and I fit thereon a loose  
 " socket having a flange at one end. This socket is provided  
 " with a pin attached to a spring lever (somewhat like a flute  
 " key), so arranged that the pin projects inside the socket, except  
 " when withdrawn by pressure on the lever. A hole is drilled  
 " into the side of the spindle in such a position that upon placing  
 " the socket on the latter, and pushing it up to the bobbin as

“ soon as the flange of the socket comes against the head of the  
 “ bobbin, the pin drops into the hole in the spindle and thus  
 “ locks the socket thereon. In order to allow of any slight  
 “ variation in the length of the bobbins I provide the face of the  
 “ flange with a friction spring, which bears against the head of  
 “ the bobbin, or with a spring-driving pin which projects into a  
 “ corresponding hole in the head of the bobbin.”

“ It will be evident that by a very slight modification this  
 “ arrangement of a spindle or bolt (with a hole in the side)  
 “ fitting into a socket with a pin and spring lever, as above  
 “ described, would be equally applicable to other analogous  
 “ purposes where a bobbin, beam, or roller is required to be fixed  
 “ on a spindle or shaft, and also to the slipping or detaching  
 “ of a carriage or carriages from a railway train whilst in  
 “ motion.”

The invention is mentioned as being applicable to the fixing of  
 beams or rollers on their shafts or spindles in warp and other  
 similar machines.

[Printed, 4d. No Drawings.]

A.D. 1865, September 4.—N<sup>o</sup> 2268.

FREEMAN, SAMUEL RICHARDS, and GRUNDY, ABRAHAM.  
 —(*Provisional protection only.*)—“ A new shackle or coupling for  
 “ connecting railway carriages, wagons, and other vehicles used  
 “ on railroads, whereby going between the carriages, wagons, or  
 “ other vehicles to couple and uncouple is rendered totally  
 “ unnecessary.”

This invention consists “ in having constructed in one piece or  
 “ forging a tapered cylindrical wrought-iron or steel plug and  
 “ corresponding socket, radiating at or about right angles from  
 “ each other, from an horizontal transverse pin or spindle, to  
 “ which the plug and socket are attached securely, which pin or  
 “ spindle works between lugs projecting from a plate fastened to  
 “ the end of a vehicle, or from the usual spring bar to which  
 “ the ordinary shackles or couplings are connected. The said pin  
 “ or spindle projecting beyond the outer side of one of the lugs  
 “ is there cranked in order to have a link connected for jointing  
 “ it to an actuating lever working upon a fixed stud, also on the  
 “ end of the vehicle; or the said pin or spindle might be length-  
 “ ened out beyond the outer side of the said lug and be actuated

“ by an eccentric motion, or by a lever affixed to its end. The tapered plug has annular slots round it up to a certain distance, and the corresponding socket is considerably bell-mouthed, so as to admit of a certain amount of play in action, and is provided with catches working upon pins in slots cut through the socket, which catches are formed so as to project in the inside of the socket, and to fall back by pressure exercised against them. whilst a corresponding plug is entering, until such plug tightens itself; the catches then fall into and lay hold of the slots formed in the plug and prevent its withdrawal so long as the catches are not released from the outside of the socket.” The other ends of the catches project beyond the socket, in order that when pressure is applied against them in the direction of the mouth of the socket they are released and held back so as to allow of the tapered plug being withdrawn, and this is effected either by an annular nut, washer, or ring screwed upon a thread formed on the outside of the socket, or actuated by eccentrics or cams. Springs may be applied to the catches, and also to certain levers which are used for actuating the eccentrics or cams, such springs preventing the vibration of the parts from altering their positions.

In using this shackle or coupling, “ it is only necessary to see that where a tapered plug is up at one end of the carriage, the socket part of a shackle or coupling on the end of the carriage which is to be coupled to it should be in an horizontal position; if such is the case and the one carriage is pushed up against the other, the tapered plug part of the shackle of the one will enter the bell-mouthed part of the socket of the other, and they will instantly become locked together, and can only be released by altering the position of the lever on the eccentric or cam shaft, or by unscrewing the annular ring, all of which operations are easily accomplished without going between the carriages.”

[Printed, 4d. No Drawings.]

A.D, 1865 September 5.—N° 2277. (\* \*)

GRAND, JULIEN.—“ Improvements in treating, working, or manufacturing cast steel for the manufacture of wheel tires, armour plates, or other articles requiring great hardness and tensile strength.”

“ When cast or Bessemer steel is brought to a white or welding heat in immediate contact with atmospheric air the said steel

" loses for the greater part its hardness and strength," and will not weld or forge well. To obviate this difficulty the steel is enclosed with "a coating or sheathing of wrought iron," by piling cast steel with piles of iron or blistered steel placed on the outside. The pile so made is hammered and rolled and made into tyres axles, or armour plates.

[Printed, 8d. Drawing.]

A.D. 1865, September 9.—N° 2319.

PENNINGTON, JOHN.—"Improvements in apparatus used for opening and closing carriage and other windows."

According to this invention "two toothed racks are used to each window, and the lower ends of these racks are pin-jointed or otherwise attached or fixed to the lower end of the window. The racks move between guides when the window is being opened or closed. Motion is communicated to the two racks simultaneously by means of cog or toothed wheels in the following manner:—On a shaft or axis is fixed a toothed wheel, which actuates a cog wheel gearing with the teeth of one of the toothed racks. The toothed wheel on the shaft or axis also gears with an intermediate wheel, and this gears with another toothed wheel, which gears with the other rack, hence, when the shaft or axis is turned round by means of a handle on a disc, or on a suitable crank fixed to the shaft or axis, the racks, and consequently the window, will be raised or lowered, and by friction it is caused to remain in any position to which it is raised or lowered."

The invention is set forth in detail as applied to "the window frame of a railway carriage door," similar arrangements, however, being applicable to other windows, and the invention being obviously applicable to the windows of ordinary carriages.

[Printed, 10d. Drawing.]

A.D. 1865, September 12.—N° 2337.

MURPHY, WILLIAM JEREMIAH.—"An improved hydraulic break for railway and other purposes."

This invention "consists principally in a means of employing the impetus or momentum of the wheel shaft or axle to act upon a hydraulic ram in a cylinder; or, in other words, by the action of its own impetus to throw the load or pressure of the

“hydraulic ram upon the wheel shaft or axle to be retarded or stopped.”

In applying the invention to railway carriages the patentee fixes “on the boss of each of the wheels (or on as many as may be thought necessary) an eccentric, the strap of which is in direct connection with a plunger working water-tight in a hydraulic cylinder. In connection with this cylinder is a water supply pipe, furnished with a cock and suitable valves, and leading from a small tank or reservoir, and on the other side is a small hydraulic ram, or a valve acted upon by a powerful spring. The hydraulic cylinder is also furnished with an air cock. When the latter is opened and the cock of the water supply pipe closed simultaneously the plunger merely draws air into the cylinder, and forces it out again as the wheels revolve, and does not exert any pressure or friction upon the latter: but as soon as the air cock is closed, and the water supply pipe is opened, then the plunger draws water into the cylinder, and forces out the ram or valve against the pressure of the spring, and thus the whole force and pressure of the hydraulic ram and spring are thrown on to the wheels, and the train is thus immediately retarded or stopped. To prevent the bursting of the cylinders by over pressure there is a small opening, which is uncovered as soon as the ram or valve has been forced out against the spring a certain distance, by which the excess of water in the cylinder can escape, and may be conducted back again into the tank.”

The patentee mentions that in this arrangement the eccentrics and plungers are always in motion so long as the carriage is travelling, but that if thought desirable the eccentrics might be coupled to the wheels or axles by clutch boxes, which would only be in gear when the break was to be applied, in which case the water supply pipe might always remain open, and the air cocks be dispensed with. He also mentions that the invention may be modified “by employing merely a plain cylinder filled with water, in which works a perforated piston (in place of the solid plunger), the said piston being connected to the eccentric by the strap as before described, and the pressure being obtained by the resistance of the water (confined in the cylinder) to the passage to and fro of the perforated piston through it, whenever the eccentric is thrown into gear with the axle or wheel by means of the clutch box.”

The invention is very fully set forth by the aid of a Drawing annexed to the Specification.

[Printed, 10d. Drawing.]

A.D. 1865, September 13.—N<sup>o</sup> 2344.

WOODBURY, JOSEPH PAGE.—“Locomotive car.”

This invention consists in “certain improvements in the construction of what are known as ‘dummy engine’ or street steam railway cars or locomotive cars, whereby they are enabled to run with perfect ease and freedom round the shortest curves that ever occur in any street or other railway tracks, and are rendered in various other respects superior to any known or used before.”

The invention is set forth at considerable length, but the essential feature thereof consists in dividing the body of the car into two compartments by a partition passing across it, the front compartment being much smaller than the hinder one, and containing or covering the engine and boiler, while the hinder and larger compartment is fitted up in the usual manner for the reception of passengers, the whole car resting upon two trucks, each having four wheels, and one truck being placed directly below the engine, while the other is placed near the hinder end of the car. The wheels are all fast upon their axles, and those of the front truck are united also by connecting rods, the power of the engine being exerted upon the axle of one pair of these wheels, but the two pairs of wheels of the hinder truck working independently of each other. That part of the car which contains the engine and boiler has on the under side of its framing a circular track or large ring, and on the front truck is a corresponding track or ring, the forward part of the car resting upon antifriction rollers which are placed between the two tracks or rings. The engine and boiler rest entirely upon the front truck, independent of the body of the car, the actual connection between the car and this truck consisting of a strong bolt or centre pin, carried by a stout flat bar projecting from a beam below the partition which divides the car, the front truck being capable of swivelling upon this pin while the vehicle is passing round a curve in the rails, vertical antifriction rollers being also so arranged as to aid in keeping the parts in their due relative positions, and relieving the centre pin from a portion of the strain which would otherwise be



thrown upon it. The hinder truck of the car by a centre pin, the hinder friction rollers placed between the mentioned.

[illegible]

[Printed, 1s. 6d. Drawings.]

A.D. 1865, September

**HENRY, MICHAEL.** — (*A comman*  
*Berthomieu, Jean Massieu, and Lo*  
*ments in railway breaks."*)

This invention has for its object to break of all the carriages of a train an attendant." According to this arrangement, a lever, or other equivalent piece, like agent, is so fitted as to be capable of being raised by a weight carried by a lever, and break blocks or friction pieces to the wheels. When the roller engages in the weight and keeps the break blocks from the wheels. When the breaks are to be worked, the like agent is worked, and the roller moves out of the angle of the weight and allows it to descend. When the break blocks or friction pieces are applied against the wheels, the lever is connected with the chain or cord of the next, one weight of the series is raised, and the break apparatus of one carriage is disengaged from the next.

“ by a lever or handle,” so that when this weight is depressed  
“ all the breaks of the train will be applied by one attendant,  
“ and all almost simultaneously. The weights are held in  
“ their depressed position by racks and catches or like contrivance.”

The details of the invention are very fully set forth.

[Printed, 1s. 2d. Drawing.]

A.D. 1865, September 18.—N<sup>o</sup> 2379.

AITKEN, RUSSEL.—(*Provisional protection only.*)—“ Improve-  
ments in locomotive engines, parts of which improvements are  
“ also applicable to railway carriages.”

According to these improvements the inventor proposes “ to  
“ divide the wheels into sets of two or more, one set to be fixed  
“ to the body or frame of the locomotive, the other set or sets  
“ being attached to a bogie truck or trucks, which are free to  
“ move laterally under the engine boiler. Each set of wheels is  
“ to be coupled by means of connecting rods in the usual  
“ manner; but in order to connect the separate sets of driving  
“ wheels so as to allow of a flexible wheel base” the inventor  
proposes to “ attach a central coupling or gearing to the first and  
“ last axle of each set of wheels.” This central coupling or  
gearing is described under different modifications.

In the first of these the friction coupling or gearing is constructed by attaching friction wheels to the centres of the axles of the first and last pairs of the different sets of wheels, there being outside these wheels sheafs or clips having bearings on the axle, and to these clips springs are attached, these springs, by means of screws or otherwise, pulling those wheels on to a central friction wheel. The axle of this central wheel turns in a long bearing, and by sliding in jaws in the sheafs prevents the sheafs from turning round, and retains the central wheel in position. These wheels are held in contact by means of screws acting on the springs, which may be tightened until the necessary amount of friction is obtained, so as to drive the wheels of the bogie resting on the rails.

According to another modification the wheels on the centres of the axles, as also the intermediate wheel, instead of communicating their power by friction only, have teeth cut on their outside periphery. “ These teeth may be cut in hammered steel,

" and made so that the pressure communicated by the springs  
 " may press the teeth into each other, but they must be made  
 " shallow, so as to allow them to free each other easily."

Instead of attaching the friction wheels to the axles intermediate  
 shafts may be used. "These shafts to be parallel with and driven  
 " by the connecting rods or otherwise, the central friction or  
 " toothed gearing, as before described, being attached to  
 " them."

The central coupling or gearing mentioned above may be made  
 to work between the ordinary engine and tenders, or may be  
 applied to the carriages so as to render the whole or part of the  
 weight of the tender or carriages available for traction.

[Printed, 4d. No Drawings.]

A.D. 1865, September 20.—N° 2394.

JOHNSON, JOHN HENRY. — (*A communication from Henry  
 Hudson Trenor.*)—"Improvements in railway carriages and other  
 " vehicles."

This invention relates, in the first place, to "a method of adapt-  
 " ing all the axles or trucks of a train of carriages or vehicles to  
 " the curves or direction taken by the leading axle or truck.  
 " whereby the danger and difficulty attending the running of  
 " railway carriages on railways, or of a series or train of connected  
 " vehicles on common roads, whether propelled by a locomotive,  
 " traction engine, or otherwise, are obviated," this being accom-  
 plished "by combining with the axles or trucks of vehicles of  
 " whatever description, when pivotted so as to have a centre of  
 " motion, a system of connection or coupling, whereby the lock-  
 " ing movement of the one is necessarily transmitted to the  
 " others." The patentee states that this may be carried out in  
 many different ways, but describes two modes of effecting it. In  
 one case the carriages are each mounted upon two trucks, the  
 trucks being connected by a link, and each truck being capable  
 of turning on a centre pin, the link of each pair of trucks being  
 of such length as to allow of its being connected with the links of  
 the trucks before and behind it, the ends of the links being  
 slotted, and one overlapping another, double-headed pins being  
 placed in the slots; or the links may be connected by means of  
 arcs united by cords or chains. In another arrangement the  
 carriages are connected by means of coupling links attached to  
 the pivots of the trucks.

Another part of the invention relates to operating the brakes of railway carriages and other vehicles, and has for its object the "effective and instantaneous application" of such brakes. The latter are operated by an eccentric which is so arranged in relation to and combined with the brakes as to directly and instantaneously transmit to the brakes any movement imparted to it. "Each wheel may be provided with one or two brakes, diametrically opposite, and the brakes of each wheel may be actuated by one eccentric; or the brakes of two or more wheels or the brakes of all the wheels constituting a truck may be worked by one eccentric. This eccentric may be situated in any convenient or suitable position, that is to say, vertically or horizontally in the middle of the truck, or upon the sides thereof, and may be made in the form of a disc or frame or otherwise, as deemed most convenient." An arrangement is described in which discs are employed, having upon them "eccentrically arranged studs which engage the levers of the brakes."

[Printed, 10d. Drawing.]

A.D. 1865, September 21.—N<sup>o</sup> 2408.

NEWTON, ALFRED VINCENT. — (*A communication from Alexander Skelton.*)—(*Provisional protection only.*)—"Improvements in railways and in the wheels for railways."

This invention consists in making or casting the wheels used upon railways "with a central flange and with a tread at each side thereof, and in using on either side of the track double rails, or two rails set side by side, their heads being just so far apart as to allow of the central flange of the wheel entering between them, and thus serving to keep the wheel from moving laterally in either direction."

The invention is designed "to obviate the hammering of the ends of the rails by the carriage wheels in passing over the joints of the same," and to also prevent accidents from the breaking of the flanges of the wheels, ordinary wheels being very liable to have their flanges broken, and the breaking of one flange causing both wheels of the same axle to be "liable to leave the track."

[Printed, 4d. No Drawings.]

A.D. 1865, September 23.—N<sup>o</sup> 2442.

**SIMPSON, JOHN HAWKINS.**—(*Provisional protection only.*)—  
 “An improved apparatus or mechanism for locking and unlock-  
 ing railway carriage doors, and for making signals with reference  
 thereto.”

This invention has for its object “the simultaneous locking or  
 unlocking of the doors of railway carriages, while it shows both  
 to the persons inside the carriage and on the outside which  
 door or doors is or are locked or unlocked.” A longitudinal  
 sliding bar is supported in suitable bearings along either the top  
 or the bottom of the carriage, and is furnished with projecting  
 bolts or other means of fastening, which, when the bar is moved  
 in one direction, slide into corresponding eyes or other receptacles,  
 and so lock the doors. Several doors are thus locked and unlocked  
 at one time, the movement of the bar in the contrary direction of  
 course releasing the doors. The latter may, however, be kept  
 closed by means of a bar alone, which is made to pass across  
 them; or where the first arrangement is used a longitudinal bar  
 at one side may be connected to a similar bar at the other in such  
 manner that the doors on one side of the carriage may be  
 fastened while those on the other side are unfastened. In order  
 to show to the passengers which doors are locked and which are  
 unlocked the apparatus used “may be made visible inside,” or a  
 moveable arm or indicator placed either inside or outside of the  
 carriage may serve the same purpose, and may either be  
 moved by the apparatus itself or be actuated by separate  
 mechanism.

[Printed, 4d. No Drawings.]

A.D. 1865, September 26.—N<sup>o</sup> 2462.

**BROWN, WILLIAM HENRY.**—(*Provisional protection only.*)—  
 “Improvements in bearing and draw springs, and springs to  
 resist concussion.”

The object of this invention “is to secure with the least weight  
 of material the greatest attainable result, and to combine with  
 the necessary strength and resisting power the greatest elasticity  
 and most effective free resilient action.” In order to accomplish  
 this the inventor takes a string or strip of steel, properly in-

dened and tempered, and of sufficient width and thickness to sustain the pressure or strain to which it is intended to be subjected. This strip of steel is coiled around a core or central cylinder, the coils being either close together or some distance asunder, the coils being "at each extremity of a diameter drawn through the core," bound or fastened together, "and to these parts of the spring when fixed the strain or pressure is applied, and by virtue of its construction transmitted and distributed throughout the whole length of the elastic coil."

"Another arrangement contemplates the formation of globular springs with elastic steel ribs, and where strength is required with one or more globes of similar construction enclosed."

[Printed, 4d. No Drawings.]

A.D. 1865, September 26.—N° 2463.

KERNOT, CHARLES MIDDLETON, and SYMONS, NATHANIEL.  
—"Improvements in the construction of railway plant to ensure the safety of passengers' lives in the event of accident or collision."

According to one part of this invention a guard's carriage is composed of an oblong body, of much smaller dimensions than the frame by which it is supported, this arrangement enabling the guard to come outside the body of the carriage "to see that all is right," a passage being thus formed all around the body, which passage is protected on the outer sides by a railing. The ends of the body of the carriage are formed of half-inch boiler plate, felt being inserted into the joints, and a door being formed at each end as well as each side of the carriage, the inside of the carriage being lined or padded to the height of four or five feet with balls of india-rubber or other elastic material, so as to save the guard from injury in case of collision.

According to another part of the invention passenger carriages, which are of the usual form as regards the construction of the body and seats, have the body supported or slung in a framework of wood or metal which is securely fixed to the lower framing of the vehicle, such framework forming in effect a cradle in which the body of the carriage is capable of moving, being provided with wheels or rollers which rest on trams or rails arranged (in the framework, these rails being curved upwards at the ends, and the result being that in case of collision the body of the carriage



moves along the trams, thus preventing the passengers from receiving so severe a shock as they would otherwise experience. Easy springs are placed between the body of the carriage and the wheels or rollers, and guides, quadrants, rollers, or endless chains may be employed to keep the body of the carriage steady: side springs attached to the top of the cradle, and a cross bar passing over the body of the carriage, being also in some cases used for the same purpose.

"Carriages can also be constructed on this principle in a "circular or any other suitable form," "so that they can be made "to revolve or move within their own circle in time of collision." And carriages of either construction may be furnished with a chain or chains passing over rollers, by which the passengers may at any time sound a bell or gong in the guard's carriage when his attention is required, the chain or chains of one carriage being connected to the chain or chains of another by a hook or hooks.

According to another part of the invention the front of each locomotive engine, as well as the back part of the last carriage of each train is provided with rails placed in an inclined position, and so contrived that in case of two engines coming into collision one will run partly up the inclined rails of the other, a similar effect being produced in case of one train overtaking another. These inclined rails are adjustable in height, and may be so arranged that a down train may have them lowered until the lower ends almost touch the rails, while those of up trains may be raised. In this case should two such trains come into collision the wheels of the engine of the up train would ascend the inclines of the engine of the down train.

Another part of the invention consists in forming railway wheels and tyres in sections, placing between the joints either wood, felt, india-rubber, or other elastic material; this arrangement not only mitigating the effects of shocks or collisions, but also admitting of the expansion and contraction of the metal. And the invention also includes a mode of preventing carriages from leaving the rails by forming the sleepers "with a rise on one "side," the rails being tubular, "but square outside," and laid in the sleepers or chairs "on wood, felt, or any suitable substance "to break the jar of the metals."

[Printed, 1s. 10d. Drawings.]

A.D. 1865, October 2.—N° 2520.

**WILLIAMS, THOMAS.**—(*Provisional protection only.*)—"Improvements in atmospheric buffing apparatus."

This invention "consists of a cylinder, open at one end, and free to slide to and fro upon a frame to which it is connected. One end of the frame carries a cross bar, to which a rod, armed at its inner end with a piston, is secured. This piston fits accurately in the cylinder, and the cylinder is free to move along the piston on the body to which it is attached receiving any shock or blow. An air cock is connected to the closed end of the cylinder."

[Printed, 4d. No Drawings.]

A.D. 1865, October 5.—N° 2552.

**HUGHES, HESKETH.**—"Improvements in machinery for shaping metal and other substances."

This invention consists "in shaping metal and other substances by means of a set of two, three, or more rolls having a sliding segment or section cut, engraved, or plain, or formed with the shape or pattern to be produced around the periphery of the rolls in gradual sections or otherwise," the object of the sliding section being "to propel the article through the rolls."

A modification of the invention is described as being applicable "for rolling and shaping railway axles." The metal which is to form the axle is passed between two or three shaping rolls, these giving the proper figure to the main portion of the axle, and also forcing a portion of the metal towards the ends of the axle, where the journals and parts immediately adjoining thereto are formed, such journals and parts being shaped by the sections of other rolls, which are fitted loosely upon their axes, so as to admit of their being moved up to or away from the work, as required. This movement of the sections is obtained by means of the inclined sides of certain sliding cotters, the inward motion of which forces the sections up to the axle to form the journal, and when such journal is formed, the cotters are withdrawn so as to leave the axle free. The patentee states that he prefers "to shape only one half of the axle at a time," and after the first half has been shaped to reheat the other half, and submit it to the action of the rolls and sections, this arrangement admitting

of the sliding sections being removed, and replaced by others of different forms.

The invention is applicable to the formation of bars, rods, tubes, and other articles, cutters, scrapers, and other mechanism being used where necessary.

[Printed, 1s. 6d. Drawings.]

A.D. 1865, October 7.—N° 2581.

CRAIG, HENRY GRIFFITH. — "Improvements in the construction of railway carriages, waggons, and trucks, and other road vehicles."

This invention consists "in the use of steel in the construction of such parts of railway carriages, waggons, and trucks, and other road vehicles as are at present made of wood, iron, or other materials." Thus the patentee proposes to "construct the bodies, panels, seats, frames, and such other parts of railway carriages, waggons, and trucks, and other road vehicles as are now made of wood or iron or other materials, of steel, whereby economy and lightness in construction" are effected; the invention being mentioned as applicable to omnibuses, carts, cabs, broughams, sociables, and chariots, and other conveyances. "Steel in sheets or plates so applied must be secured by bolts, screws, or otherwise, the various parts being placed and fitted to each other by planing, and by other process known in the manufacture of steel articles."

[Printed, 4d. No Drawings.]

A.D. 1865, October 9.—N° 2595.

VOIGHT, GEORGE. — "Improved mechanical arrangements for stopping or retarding railway carriages, waggons, and trucks."

This invention consists "in causing the buffer rods to work the brakes," to accomplish which the patentee lowers the buffers and buffer rods "to a level with the axles of the wheels, so that the brake blocks, which are affixed to the ends of the buffer rods, come directly opposite the flanges of the wheels. In order that the buffer rods may be so lowered, the main framing of the carriage should be prolonged downwards, and the buffer rods made to work easily through bearings placed on the said projecting portion. To prevent the carriages rushing upon each other, distance pieces may be fitted to the back and

" front framing of each carriage, and may be made to fold up  
 " out of the way when not required, the said distance pieces  
 " being of such a length that the brake blocks may come against  
 " the flanges of the wheels when the buffers of any carriage are  
 " pressed by the previous or following carriage or carriages.  
 " These distance pieces may be constructed of wood or metal,  
 " and attached by suitable hinges to the framing, so that when  
 " not required they can be folded back against the ends of the  
 " carriage or truck. As soon as the train is stopped, or a uni-  
 " form retarded speed is obtained, the carriages adjust themselves,  
 " and so relieve the wheels from the action of the brakes."

Two modes of carrying out the invention are described. In one arrangement each buffer rod has about midway of its length a slotted projection, within which the upper end of a vertical arm works, this arm being mounted upon a fulcrum about midway between the two wheels, and having at its lower end two horizontal arms projecting in opposite directions, there being at the end of each of these arms a brake, and these brakes being pressed against the wheels upon the buffer rod being moved in either direction. In the other arrangement the brake blocks are each connected to a toothed sector, which is acted upon by a rack on the buffer rod.

[Printed, 82. Drawing.]

A.D. 1865, October 11.—N<sup>o</sup> 2621.

HENRY, MICHAEL. — (*A communication from Henry Giffard.*)—  
 " Improvements in railway carriages and locomotives."

The object of this invention is to reduce the "oscillation or  
 " vibration and lateral motion" of railway engines and carriages.  
 In applying the invention to the latter the body of the carriage  
 " is fitted over or combined with the frame or under carriage, at  
 " a little distance from it, so that there shall be a small space  
 " between them," suitable connections, fittings, and interposed  
 appliances being used, and means being provided "of presenting  
 " sufficient friction and resistance to the motion of the body with  
 " respect to the under carriage to prevent undue play of the  
 " former on the latter."

Various arrangements are set forth as being applicable for the  
 purposes of the invention. Thus spherical, elliptical, or other-  
 wise shaped rollers working between plane or concave surfaces  
 may be interposed between the under carriage and the body

of the sliding sections being removed, and replaced by others of different forms.

The invention is applicable to the formation of bars, rods, tubes, and other articles, cutters, scrapers, and other mechanism being used where necessary.

[Printed, 1s. 6d. Drawings.]

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 “ form retarded speed is obtained, the carriages adjust themselves,  
 “ and so relieve the wheels from the action of the brakes.”

Two modes of carrying out the invention are described. In one arrangement each buffer rod has about midway of its length a slotted projection, within which the upper end of a vertical arm works, this arm being mounted upon a fulcrum about midway between the two wheels, and having at its lower end two horizontal arms projecting in opposite directions, there being at the end of each of these arms a brake, and these brakes being pressed against the wheels upon the buffer rod being moved in either direction. In the other arrangement the brake blocks are each connected to a toothed sector, which is acted upon by a rack on the buffer rod.

[Printed, &c. Drawing.]

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 “ between them,” suitable connections, fittings, and interposed  
 appliances being used, and means being provided “ of presenting  
 “ sufficient friction and resistance to the motion of the body with  
 “ respect to the under carriage to prevent undue play of the  
 “ former on the latter.”

Various arrangements are set forth as being applicable for the  
 purposes of the invention. Thus spherical, elliptical, or other-  
 wise shaped rollers working between plane or concave surfaces  
 may be interposed between the under carriage and the body, so



that the latter works thereon ; or the body may be suspended by arms, chains, straps, springs, cords, rods, or similar contrivances rendered adjustable by screws or otherwise. The body may be fitted on brackets suspended from the frame or under carriage at their lower ends by chains or the like, disposed obliquely or otherwise ; or it may be supported on a segmental block or bracket, or on springs disposed vertically, or on wheels or segments turning or oscillating on axes or on cranks. The body and under carriage may be kept together by chains, stops, uprights, jointed rods, or other means, and adjustable springs may be fitted at intervals between the body and the under carriage. These may be attached at top to the latter, and at bottom to brackets on the former. " One arrangement consists of a number of spiral springs " attached to two plates enclosed in a double casing ; or band " springs acting vertically or transversely may be used. For " resisting transverse oscillation an arrangement may be used in " which a rod or piston works in a cylindrical or conical chamber " attached to the body, and bears on a plug or buffer against " which works a spring. To this rod or piston is jointed a rod " or arm, which is connected at bottom with a cylindrical or " conical tube, which fits round a rod, buffer, or plug fixed to " the frame or under carriage, and is tightened by a spring or " otherwise. A large longitudinal or transverse spring may be " used, fastened at the centre to the under carriage, and having " at its ends straps or bearings supporting adjustable arms for " cranks, working on axes or pins held in brackets secured under " the body. The spring may be in halves, jointed together. " Instead of the spring a rod with ball-and-socket joint may be " used, the pin which works in the strap being fixed directly " under the frame or under carriage."

In applying the invention to a locomotive, the latter is constructed in two parts, an upper part or body, and a lower part or under carriage. The former comprises the boiler and furnace and their accessories, and the latter the wheels, under carriage frame, axle guards, ordinary springs, driving and motion gear, and appurtenances. The upper portion or body is combined with the lower portion by one or more of the arrangements mentioned above, the steam pipes being of course flexible or jointed.

" It is important that carriages to which this invention is " applied should have the bodies hung about one or two feet " from the under carriage, and when supported on rollers the

" curve of the plates on which the rollers work must of course correspond with this length." }

[Printed, 10d. Drawings.]

A.D. 1865, October 14.—N° 2654.

ARMITAGE, WILLIAM JAMES, WOOLER, FAIRFAX, and HODGSON, JOHN.—"Improvements in the manufacture of " tyres for railway wheels."

This invention consists "in forming the tyres of railway wheels " from a solid block of iron, and making them ready for rolling " without being jointed or having an end weld." A mode of carrying out the invention is described in which a pile formed of a number of slabs of iron is welded into a block of nearly square form, which is then placed upon an anvil and a hole made through its centre by means of a large punch, there being a hole in the anvil, which allows the punch to be driven completely through the block. The latter is then laid upon an "inclined bed" attached to the anvil, and the hole in the block is gradually enlarged by the use of a hammer, the "nose" of which is of peculiar form, being inclined on one side and straight on the other, and having in some cases an "additional lug" connected, the action of the hammer gradually widening out the hole in the block, and the bed of the anvil being of such form that the combined action of the hammer and anvil bring the block at length into the form of a tyre, the block being gradually turned round during the operation.

Another mode of carrying out the invention is described, in which a hammer, having a nose on each side, is made to operate upon two blocks at once, the anvil being furnished with two inclined beds, one of which forms a part of the anvil itself, while the other is moveable, being held in its place by a pin or pins inserted into a hole or holes in the anvil, and one bed having the portion which forms the tyre inside, while on the other it is outside. Rough tyres thus formed are afterwards rolled in the usual manner.

[Printed, 10d. Drawing.]

A.D. 1865, October 19.—N° 2695.

PENTON, JOSIAH.—"Improvements in forging and swaging " steel and iron wheel tyres, and in the apparatus or tools employed " for that purpose."

This invention has for its object the expeditious forging of the tyres and rims of wheels, and forming single or double treails or flanges thereon, and is "more especially adapted for forging or swaging two tyres simultaneously." The invention consists "in acting upon the tyres by means of anvil and hammer dies or moulds in vertical or horizontal steam hammers, which dies or moulds have such a form and position that the whole surface of one part of the tyre is acted upon at once and uniformly, whereby the quality of the tyre is improved." The anvil is formed by preference with two sloping sides, these being furnished with hubs or swages, having upon their upper sloping faces dies or moulds with the configuration of the inner surface of the rim or tyre to be forged, and upon the correspondingly sloping faces of the hammer are formed dies or moulds with the configuration of the outer and one side surface of the tyre, whilst the sloping side of the anvil forms the mould for the opposite side surface. "By this arrangement the complete die of the tyre formed by the hammer and anvil has such a position and arrangement that no face of the same is parallel to the direction of the stroke of the hammer, so that every face of the tyre is more or less equally acted upon by the blows of the hammer, whilst at the same time the tyre freely delivers from the dies. The tyres are first made in a 'cheese' form, after which a sufficiently large hole is punched in their centre to enable their being placed over the before-mentioned hubs or swages on the sloping side or sides of the anvil, against which they consequently lie also in a sloping position. As the tyres are acted upon they are turned round by hand levers."

Another part of the invention consists "in forming the anvil to vertical steam hammers with a recess in the middle, across which recess a strong mandril is placed; one wheel tyre, or by preference two tyres placed face to face, is or are hung upon such mandril so as to be suspended in the before-mentioned recess in the anvil, and the parts of such tyres which rest upon the mandril are then acted upon by a die or mould having the necessary configuration formed in or fixed to the hammer face."

The details of the invention are minutely set forth. The anvils and hammers may have more than two sloping faces, or only one such face, as may be preferred.

[Printed, 10d. Drawing.]

A.D. 1865, October 21.—N° 2729.

GIRARD, LOUIS DOMINIQUE.—“Obtaining sliding surfaces by  
“the interposition and circulation of a liquid or gaseous fluid  
“between the frictional surfaces.”

The principle on which this invention is based “is the interposition at a suitable pressure of a gaseous or liquid fluid between the surfaces sliding in contact.” An arrangement is described as being applicable to the bearings of machinery in which the bearing contains “three principal compartments,” having wide ribs or flat surfaces between them, which serve to support the shaft in case of a deficiency of water (which is used in this case), the middle compartment receiving such water from a force pump, and such water passing thence to the two side compartments between the surfaces of the shaft and the lower ribs; the result of the arrangement being that the pressure of the water, on the rising of the shaft or axle, becomes equal in the three compartments, this being facilitated, moreover, by the formation of a channel across the ribs, and the shaft being thus maintained in equilibrium.

A modification of the invention is set forth as being applicable to a railway axle-box, the brass bearing having in it compartments such as mentioned above, grease, however, being added as the lubricating material, and water being supplied to the bearing by means of “three partial taps,” one of which is of the ordinary kind, and is placed on the side of the supply receiver of the axles, the next, which is fixed, being “provided with small orifices forming a sieve,” which prevents the dirt contained in the water from being taken to the third tap, the latter having a small orifice which allows “only sufficient water to pass to maintain the pressure between the bearing and the axle.” The details of this part of the invention include various bolts, springs, packings, and stuffing boxes, by which the parts are kept in due position and in working order. The invention is also described as being applicable to “sliding railways,” the results being that “the line can be raised at will;” “the rails are enabled to move so as to allow for expansion or contraction,” and the two rails of a line are held firmly apart.

[Printed, 2s. Drawings.]

A.D. 1865, October 23.—N° 2737.

GEDGE, WILLIAM EDWARD.—(*A communication from Prosper Piot and Edmond Piot.*)—(*Provisional protection only.*)—"An improved axle box for supplying oil to the journals of railway vehicles."

This axle box is composed of two parts, one of which is moveable, "and this particularity is the main characteristic of the invention." The upper part of the box is of cast iron, furnished with a bronze bearing at the point of contact with the axle journal. The bottom of the box is composed of a moveable slide, placed in grooves in which it is capable of moving, and consisting of "two superposed compartments," of which the lower one forms the oil reservoir, into which is plunged a wick or plug, which carries up oil to the journal of the axle. The upper part of the slide is concave, for the reception of any excess of oil which may be furnished by the wick, such oil returning to the reservoir through an opening provided for the purpose. The slide is kept in its place by a key or wedge when the parts are in working condition, but on the removal of such key or wedge the slide can be removed also, allowing an inspection of the state of the journal and other parts, or the rapid substitution of a new axle for an old one, the slide itself being easily replaced in case of damage thereto.

[Printed, 4d. No Drawings.]

A.D. 1865, October 27.—N° 2771.

GREENWOOD, THOMAS.—"Improvements in the manufacture of wheels for railway carriages, and in the machinery to be employed therein."

The object of this invention is to construct railway wheels "with a wooden filling between the felloe or rim and the hub, boss, or nave of the wheel in a more expeditious and economical manner than has been hitherto done."

The first operation is to cross-cut the wood by means of a cross-cut circular saw. "The saw traverses, and the wood is laid stationary against a fence at right angles to the saw, and is by this means cut to the required form. The blocks of wood are then secured upon the table of a planing machine, having a revolving disc table provided with a number of dogs fixed upon slides provided with screws," these holding the blocks while the table rotates and carries them under a cross head and certain

cutting tools which level the upper surfaces of the blocks, the latter being then turned over and the other surfaces similarly treated, the blocks being thus, moreover, reduced to one uniform thickness. They are next taken to the "jointing saw frame," in which a fine circular saw cuts each block into "the required angular or segmental form."

The blocks are now operated upon by "a compound sawing and cutting or rebating machine," in which the outer ends of the now segmental blocks are rebated to receive the rings or flanges which are used to hold the segments and the tyres together, this being effected by means of an endless ribbon saw; various slides, guide pulleys, screws, and other mechanism being used in this part of the invention. The blocks are then taken to a "single spindle boring machine," having an adjustable recess for the reception of blocks of different sizes, this machine boring a bolt hole in the joint between the blocks, "so as to form a half hole to suit the flange in the nave."

In the next operation the parts are put together to form the wheel, for which purpose the prepared blocks are taken to a compound hydraulic press, by which the blocks, tyre, and nave are united, and the wheel thus formed is next taken to a compound drilling machine, in which drills driven by suitable gearing are arranged in a circle, and are adjustable radially to the diameter of the wheel to be operated upon, these drills forming holes through both iron and wood into which are inserted bolts which secure the blocks in their places. A rack and pinion connected with a rotating plunger, and certain cams, wheels, friction pulleys, and other mechanism, are employed in this operation, but the details of this, as well as of the other parts of the invention, are of somewhat complex character, and will only be clearly understood with the aid of the drawings annexed to the Specification.

[Printed, 2s. 8d. Drawings.]

A.D. 1865, October 31.—N<sup>o</sup> 2798.

MATTHEWS, DAVID PERFIT GRIFFITHS.—"Improvements in means or apparatus for distributing sand or other suitable matter on the rails of railways to promote adhesion of the locomotive wheels thereto."

According to this invention the patentee employs, say, four boxes or chambers, applied to the engine, or to the tender, or to one of the carriages of a railway train. Two of the four boxes or



chambers are placed within or are supported by the other two, and they contain the sand or other substance suitable for the purpose, wet or dry. "These boxes or chambers may be termed "inside boxes and outside boxes; they are fitted with perforated "valves which are coupled by rods to a rocking or weigh shaft, "or by other suitable means, in order that the rails on each side "of a line of railway may be simultaneously and uniformly sanded "in front of the wheels to which adhesion is to be given when "required."

"The apparatus may be arranged and worked in various "ways," but an arrangement is described in which "an inside "box or hopper is employed, the bottom of which inclines to the "centre (where practicable) at such an angle that the sand will "slide thereon and conduct itself into a chamber of the apparatus, where the fine sand will be separated from the coarser, "after which process the fine sand will be conducted by a pipe "on to the rails, and the pebbles or the coarser of the sand may "be discharged into the bottom of the outside box, or be allowed "to fall away by the side of the rails. The sand or other substance used for this purpose may be retained in the chamber "and box by a partly perforated disc valve, which may be dished "to clear itself, and may be fitted with a valve, both of which "may be made fast to spindles, and the former valve held to its "seat by a spiral or other suitable spring, or by weights."

"The same apparatus may be worked by conical valves coupled "as above, but fitted with levers, cranks, and weights, or the "apparatus may be worked with eccentric disc valves (or with "other valves), and kept tight by springs or weights, and coupled "as herein mentioned." And the apparatus is brought into action so as to distribute sand upon each line of rails simultaneously by the engine driver or other attendant.

The invention is described under a great variety of modifications, clutches, racks, cords, springs, agitators, wind screens, and other mechanism being used in carrying out the details of the various arrangements set forth.

[Printed, 2s. Drawings.]

A.D. 1865, November 1.—N° 2816.

FARNWORTH, JOHN KAY.—"Improvements in apparatus for "raising and lowering the windows of railway and other carriages, "and other windows."

This invention is applicable to the windows of railway and other carriages, and may be applied to other windows, "and consists in an improved arrangement of parts for opening, closing, and retaining in the desired position such windows." In carrying out the invention the patentee applies a ratchet rack to each side or edge of the window, "with the horizontal part of the teeth upwards, and catches in the frame of the window, one to take into each rack; these catches are released from the racks simultaneously by a double lever or tumbler actuated by a handle and cords, bands, or chains, or by other suitable means. The window is counterweighted by a preponderating weight or weights, consequently as soon as the catches are disengaged from the racks, the window will open or close as desired, according to the purpose for which the fittings have been specially applied," or the racks and catches may be applied to windows which are not counterbalanced, and raised in the usual manner, or in the manner described in the Specification of the Patent granted to the present patentee on the 28th of June, 1865, No. 1718, such windows being allowed to drop by their own gravity when the catches are released from the racks. The latter may be furnished with grooves, these working upon beads or tongues in the frame of the carriage door, and this arrangement preventing the window from rattling, or such grooves and tongues or beads may be dispensed with. Or the racks may be grooved on the reverse side, and the glass of the window be fitted into such grooves, the racks being fastened at the lower ends to a rail of wood which works "up and down the interior of the panel of the door invisibly," the usual window frame being thus dispensed with, the glass only in this case being visible.

When the invention is applied to "domestic or similar windows" it operates as a self-acting fastening, so that the window cannot be left closed and unfastened, nor can it be unfastened from the outside. Moreover, the top sash, though so high as to be out of reach (as, for instance, in a law court), may be opened and closed with facility."

[Printed, 8d. Drawing.]

A.D. 1865, November 3.—N° 2840.

WILSON, GEORGE, and HYDES, WILLIAM KITCHING.—"An improved arrangement of buffing and drawing apparatus for railway carriages."

According to this invention one central bar is made to act both as buffer rod and draw bar, such bar, however, not extending the whole length of the carriage, but there being one such bar extending below and projecting from each end of such carriage. Each bar has placed upon it four wrought-iron or steel washers, between each two of which are placed springs, which may either be conical or volute springs of metal, or springs made of india-rubber or other elastic material, there being also upon each bar, in the space between the washers not occupied by springs, wrought-iron ferules or nuts, the whole arrangement being included within an iron case, which may be made in two halves, and held in its place by tie rods, the latter passing entirely through the frame of the carriage or waggon, so as to brace all the parts well together. The projecting end of each bar is furnished with a buffer head, and also with links and pins for coupling the carriages together, each bar working in a cast-iron socket which acts as a guide.

When one of these bars acts as a buffer, the washers in front of the springs compress the latter between themselves and the washers behind the springs, which then abut against certain collars fixed to the framing; and, on the contrary, when such bar acts as a draw bar the washers behind the springs compress them between the back and the front washers, which now come in contact with other collars arranged for the purpose.

[Printed, 10d. Drawing.]

A.D. 1865, November 6.—N<sup>o</sup> 2858.

SIMS, REUBEN, and BURNS, ROBERT.—(*Provisional protection only.*)—"Improvements in the formation of railway carriages."

This invention consists in "altering the interior arrangement  
 " of the seats of railway carriages as at present constructed by  
 " taking out the cross partitions or seats in the first place, stop-  
 " ping most of the doors at the sides of the carriages, and arrang-  
 " ing the seats so as to leave a passage down the centre, or if  
 " preferable at one or both sides instead of the centre; thus two  
 " rows of seats will form a separate compartment as at present,  
 " but instead of entering these compartments by doors outside of  
 " the carriage they will be entered from the passage or passages  
 " inside, thus giving a communication from one compartment to  
 " another without going outside the carriages, one exit door at  
 " any convenient part of the carriage being sufficient for all the  
 " passengers in that carriage." And if found desirable a doorway

may be formed in the ends of the carriages, and large metal tubes be attached to the carriages, capable of enabling a person to pass from one carriage to another, the tube of one carriage sliding in that of the next. An "interior passage" may thus be formed from one end of a train to the other, "and the carriages may be made wider, as there will be no necessity for the footboards all along the sides of the carriages as at present, but only opposite each exit door."

[Printed, 4d. No Drawings.]

A.D. 1865, November 6.—N° 2860.

**MANSELL, RICHARD CHRISTOPHER.**—"Improvements in the construction of wheels for engines and vehicles used on railways."

This invention consists "in making certain new and improved forms of retaining rings or tyre fastenings, and fixing them in combination with the tyres of wheels in such a manner that they will not only hold tyres to the bodies of wheels, but will also support and sustain in proper position the parts of tyres which project over the sides of the wheels, and by so doing admit of the tyres being worn thinner than at present, and prevent the mischief consequent on the present system, which allows the sides of tyres to project, and in wear to bend over the retaining rings or tyre fastenings, and sometimes break off."

Various forms of these retaining rings are described, in one case such a ring being made with a rib or flange projecting from each side of its outer periphery, the inner rib entering a groove in the tyre, and the outer rib supporting that part of the tyre which projects over the side of the body of the wheel. In another case the retaining ring has a rib or flange projecting only from the outside, the inner side being grooved to suit and receive the lip of the tyre. And in another case the ring is made from flat bars of metal, having a groove in its inner surface for the reception of the lip of the tyre.

These retaining rings may be applied in combination with "any of the usual descriptions of wheel bodies or centres," whether composed of metal only, or of metal and wood. And the form of the ring may be varied to suit the particular construction of wheel.

[Printed, 10d. Drawing.]

A.D. 1865, November 8.—N° 2886.

ALLEN, WILLIAM DANIEL.—“Improvements in casting hoops  
“ of steel suitable for making tyres.”

Before describing this invention the patentee mentions that it has been usual to make each mould for casting a hoop of steel suitable for a tyre “with a separate get or runner,” which arrangement is very inconvenient when large charges of melted steel, such as are prepared by the Bessemer process, have to be cast into such hoops. He then goes on to state that according to this invention he arranges “one get or runner to supply two or a greater number  
“ of moulds,” and in carrying out the invention “it is convenient  
“ to place the moulds concentrically one over the other, and to  
“ have a suitable core passing down through the centre of the  
“ set; the get or runner may pass down through this core, and  
“ lateral openings may be made from it into each of the moulds;  
“ or the steel may be conducted by one get or runner into the  
“ bottom mould only, and be allowed to pass from thence into  
“ the other moulds by holes provided for the purpose, either in  
“ the plates or covers which separate the castings, or by  
“ passages in the core communicating from one mould to the  
“ other.”

Other modes of carrying out the invention may be adopted. For instance, instead of running the steel down the core a properly arranged passage or get may be made outside the moulds, communicating to each mould by lateral passages, or the steel may be conducted by one get or runner into the bottom mould only, and be allowed to pass from thence into the other moulds by holes provided for the purpose, either in the plates or covers which separate the castings, or by passages in the core communicating from one mould to another.

These arrangements are meant “to save waste of metal and to  
“ facilitate the casting operation.”

[Printed, 6d. Drawing.]

A.D. 1865, November 11.—N° 2909.

REID, WILLIAM.—“Improvements in supplying cattle with food  
“ and water on railways, and in the apparatus or means connected  
“ therewith.”

This invention is based upon that for which a patent was granted

to the present patentee on the 21st of December, 1864, number 3174, and consists "in erecting at railway stations, sidings, or " other suitable points on a line of railway, a set or sets of supports, posts, or pillars, to which are attached either hoisting or " lowering gear or hooks, by means of which a trough or troughs " may be raised to a height sufficient to enable the animals when " in the train to drink or feed therefrom, the water or food being " previously placed in the trough for that purpose," the essential feature of the invention being "the application of a set of troughs, " however, fixed or otherwise raised or lowered, and separately or " detached from the trucks or wagons. The trough may be " fitted with a hose for supplying the water from the usual tanks " at railway stations."

The patentee states that there are numerous mechanical devices which may be employed in carrying the invention into practice, and so as to give to the troughs either horizontal or vertical motion. Tanks may, if desirable, be fixed at the ends of the troughs for the purpose of supplying them with water on the approach of a train, and such troughs may be placed between the two lines of a railway, in which case "two trains can be " supplied at once." Should the ordinary space between the two lines of rails be too narrow for the troughs, they "must " either be raised or lowered, or made so that they can be shut " by a parallel motion of the sides, the troughs being suitably " constructed with hinged joints."

[Printed, *ad.* No Drawings.]

A.D. 1865, November 14.—N° 2927.

**WILLIAMSON, JOSEPH, LINDLEY, JAMES, and COLEMAN, JAMES.**—"Improvements in breaks."

This invention consists in the employment of a rod or rods placed in or beneath the framing of a railway or other carriage in bearings in which such rod or rods may partly revolve. "Each " rod is provided with one or more arms, to which is hinged one " end of a lever, having its other end hinged or otherwise " attached to one end of another lever, to the other end of which " last-named lever are attached the ends of two straps, whose " opposite ends are hinged or attached together, and work upon " a pin or axle lying in a bearing secured to or forming part of " the under framing of the carriage or vehicle. These two straps



“ have upon their inner sides friction blocks, so secured to them  
“ that when worn they may be readily replaced by fresh blocks ;  
“ the straps and friction blocks are placed upon the circum-  
“ ference of a drum or pulley keyed or otherwise secured fast  
“ upon one or all of the axles of each pair of wheels of the  
“ carriage or other vehicle. There may be one drum on the axle  
“ of each pair of wheels, or two drums on each axle, in which  
“ case there would be two rods and levers ; in either case, how-  
“ ever, the rods are arranged to operate upon the straps and  
“ friction blocks in such manner that when a hand lever or an  
“ equivalent contrivance is moved slightly to the right or left  
“ (according to the way in which it is arranged to act) such blocks  
“ will embrace the drum and prevent the revolution of the wheels,  
“ so as effectually to stop the running of the carriages or vehicles  
“ either on the level or on an incline. A spring catch and lever  
“ are conveniently placed to act in such manner that the rod  
“ which carries the first-named lever will be held in either of the  
“ positions in which it is placed. Each of the above-named  
“ partly revolving rods is provided at either or both ends, in  
“ addition to the usual coupling chains and draw bar, with a  
“ reversible swivelled coupling, in order that a carriage or vehicle  
“ may be removed from a number of carriages or vehicles and  
“ the remainder of them connected together or attached to each  
“ other as safely as if it had not been so removed.”

The details of the invention are set forth at some length, and illustrated by a number of elaborate drawings.

[Printed, 2s. 10d. Drawings.]

A.D. 1865, November 14.—N° 2928.

LOUBAT, JOSEPH ALPHONSE.—“ Improvements in railway  
“ steam engines and carriages.”

This invention relates for the most part to matters connected with locomotive engines which do not require notice here. The engine and boiler are mounted upon a truck or frame which is completely independent of any other vehicle, though capable of being readily connected therewith, and is provided with breaks which act not only on the driving but also on the bearing wheels when brought into operation, these breaks consisting of blocks, hollowed on one side to correspond with the circumference of the wheels, and placed between the front and hinder wheels, being pressed in opposite directions and against such wheels when

necessary by a screw, which is turned by a hand wheel, and operates certain levers and connecting rods, the break blocks themselves sliding upon fixed horizontal bars. The front of the truck also carries an apparatus for removing obstructions from the rails, this consisting of a kind of frame supported by diagonal and other rods.

The first carriage of a train is described as resting partly upon a "jointed truck" having four wheels, and partly upon the engine truck, to which it is connected by a central "poll bolt," and all the carriages of the train are likewise "mounted on jointed trucks," the wheels of the trucks being "sufficiently near to each other to allow of the train travelling round curves of comparatively small radius." A back view of a passenger carriage is given in one of the drawings annexed to the Specification, from which it would seem that access to the carriage is meant to be obtained from the back as well as at the sides, a flight of steps leading from each side of the carriage to a platform in front of the door.

The working parts of the engine are enclosed in a case, "in which the driver stands."

[Printed, 1s. 8d. Drawings.]

A.D. 1865, November 15.—N° 2942.

VELU, LOUIS ALEXIS, FOSSE, FRANÇOIS EUGÈNE, and FOSSE, LOUIS EUGÈNE ALPHONSE.—"An improved arrangement of mechanism for stopping or retarding railway carriages, waggons, trucks, or other rail or tram road vehicles."

This invention consists mainly in the employment of wedge-shaped blocks which, when it is desired to stop a train, are interposed between the rails and props or stays fixed against the lower surface of the frame of the carriage or the buffer bars, and so as to cause the weight of the carriages to press upon such blocks and ascend the upper surfaces thereof, the wheels of the carriages being thus lifted in fact from the rails, and the train being brought to a stand by the friction created between the lower surfaces of the blocks and the rails. One block is placed in front of each wheel of each carriage.

The patentees state that they do not limit themselves to any particular means of putting these blocks into and out of action, nor to any particular means of connecting the blocks of each

carriage together, or of causing the whole of the blocks of a train to act simultaneously, as various mechanical arrangements may be resorted to for these purposes. They describe an arrangement, however, in which by turning a handle a pinion is made to act upon racks connected to certain bars which are jointed to other bars placed across each other, these again being jointed to longitudinal horizontal rods, which by the rotation of the pinion and movement of the racks and bars are made to move certain cross bars which drive the blocks under the wheels.

[Printed, 10d. Drawing.]

A.D. 1865, November 29.—N<sup>o</sup> 3068.

HOWARTH, RICHARD. — "Improvements in apparatus for  
" increasing the safety of railway passengers and trains, signalling  
" and forming a communication externally and internally between  
" all parts of such trains; lighting, warming, and securing the  
" doors of the carriages, and indicating therein and at the  
" stations the names of the places at which the train stops."

This invention consists in the first place "in making the foot-  
" boards of railway carriages form a continuous platform or  
" gangway along the sides of the train." The footboards are  
mounted on brackets or arms which are capable of turning  
radially and carrying the footboards in and out from and parallel  
with the sides of the carriages, and in order to enable persons to  
walk from one end of the train to the other the footboards are  
made to, "extend at the ends," such extending ends being  
bevelled so that one will slide over another when the compression  
of the buffers causes them to meet and pass each other. The  
footboards are formed, by preference, "somewhat like grates or  
" framework, a little longer and as much wider than the carriage  
" as will allow them to form a gangway on either side when  
" moved laterally from the central position." The bars of these  
framed platforms have bevelled edges, and are placed with their  
broad parts uppermost. They are fitted across the carriage, above  
the framing but below the floor, the ends being secured by ribs  
of wood or iron; "the length of the bars may be equal to the  
" width of the carriage only, and be divided in the centre, the  
" two halves being connected by spring couplings, to draw them  
" in when not in use;" upon the under framing there are a number  
of bevelled edged joists with their narrowest parts uppermost.

" to form guides or slots in which the bars above mentioned slide in and out readily ; upon these joists the carriage body is fixed and secured." Instead of arranging the footboards on the radiating or sliding principle, as mentioned above, " they may be hinged to rise and fall and be supported by sliding supports fitted under the carriages." These footboards are moved as may be requisite by means of longitudinal shafts and levers, which pass along each side of each carriage, such shafts also carrying " rising and falling steps at the doors, and securing the same thereby." These shafts are bent or cranked at each end so as to afford facilities for connecting the shafts of one carriage with those of another, the cranks thus formed being " tied by short connectors to longer and flexible crank arms or unions, which are fitted to turn upon the buffer rods or upon studs fixed upon the ends of the carriage at an equal distance from the centre thereof, and of one uniform height above the rails," another mode of coupling these shafts consisting in making them " with forked and link ends, so that they may be always in gear for turning each other whenever the carriages fitted therewith are brought together and coupled in the ordinary way. The shafts may be fitted on the tops of the carriages when required for signalling purposes only," various modifications of this part of the invention being described.

Another part of the invention consists in establishing an internal communication throughout a train, by " forming shells or tubes open at each end to receive the entire body of the carriage." These shells or outer cases are of sufficient width to contain the body of the carriage " and leave a space at the side sufficient for persons to pass along from end to end. The body of the carriage in such cases is made to slide or swing from side to side of the shell, so that the passage may be formed on either side," such body being mounted upon radial arms for that purpose, and at the ends of the shell carriage there are openings at each side, furnished with gates by which the improper entry into or exit of persons from the carriage is prevented.

The invention is described at considerable length, the details being capable of various modifications, and such details including various arrangements of signal lamps, one of which is described as being moved into different positions by the movements of the footboards, signal bells, apparatus for lighting and warming the carriages by means of gas, such carriages being also in some cases

warmed by pipes containing hot water, pneumatic tubes "for conducting sound" and other purposes, and indicators for showing to the passengers the names of the stations at which the train stops. These arrangements however, do not belong to the present series of abridgments.

[Printed, 1s. 10d. Drawings.]

A.D. 1865, December 1.—N<sup>o</sup> 3084.

DODDS, THOMAS WEATHERBURN. — "Improvements in the manufacture and treatment of railway bars, tyres, and axles, also in the construction of furnaces, machinery, and apparatus connected therewith."

This invention relates to the construction of the cementing or converting furnaces used in steeling the wearing surfaces of railway bars or other material. For the purpose of obtaining uniformity of heat in the cementing chambers, chimneys and dampers are applied to each side of the furnace in connection with the side flues, the communication with which chimneys may be separately opened or closed as required, thereby giving facilities for the regulation of the heat not obtained by the use of a single chimney, as usual. And for the purpose of increasing or diminishing the heat at any required portion of the furnace a series of adjustable flue valves or regulators are applied to the openings leading into the side flues.

By another arrangement the cementing furnaces are heated by the waste heat from coke ovens, or the gases generated therein, or from the waste heat of other furnaces, to which coke ovens or furnaces the cementing furnaces are connected by means of flues.

For the cementation of endless tyres the cementing chambers are circular, the upper portion or dome being removable so as to admit of the tyres being taken out of the chambers without letting out the fires or cutting off the connection with the source from which they are heated. Bars, or metal in other forms, after undergoing the process of cementation are to be drawn from the furnaces in a heated state, and then passed through rolls or under hammers for the purpose of condensing or closing the fibres or crystals of such bars or other articles. The rolls are specially arranged so as to condense those portions of the railway bars, tyres, or axles, to which the process of cementation has been

applied, and for this purpose two, three or more rolls are or may be applied, such rolls being arranged to suit the form of the article to be operated upon, some of the rolls holding such article, and the others condensing the cemented surface or surfaces thereof. The latter may likewise, if preferred, be condensed by hammering instead of by the use of rolls.

[Printed, 1s. 8d. Drawings.]

A.D. 1865, December 8.—N° 3158.

PRICE, RICHARD EVAN.—(*Provisional protection only.*)—"Certain improvements in the manufacture of tyres for railway wheels, and in apparatus connected therewith."

This invention consists in beating, hammering, pressing, or forging the periphery of a plate of steel or other metal in a die, to impart thereto the external shape desired, and afterwards punching out the centre of the plate, and leaving the tyre formed without a weld or joint from one piece of metal. The apparatus employed consists of an anvil block, in the upper part of which is the die which shapes the flange and periphery of the tyre on the die being hammered, the block being also provided with a certain movable plate, which during the process of shaping the periphery remains in the block, but is withdrawn when the centre of the plate for forming the tyre is about to be punched out, a plate being then inserted into the block into which the blank centre punched out is forced, and, being removed, leaves the tyre formed as desired, "and by replacement of the front plate the machine is ready when the tyre is removed from the die for a continuation of the operation." The apparatus may be actuated by steam, hydraulic power, or compressed air.

[Printed, 4d. No Drawings.]

A.D. 1865, December 14.—N° 3244.

NEGRETTI, HENRY, and ZAMBRA, JOSEPH WARREN.—(*Provisional protection only.*)—"Improvements in the construction and arrangement of railway carriages, for the purpose of obviating or diminishing the bad consequences of collisions of or accidents to railway trains."

This invention consists "in connecting the bodies of railway carriages in such manner to the under framework to which the wheels are adapted, that in the event of a collision, either in



" front or from behind, the connections between the bodies and  
" the under framing of the carriages will be ruptured by the  
" shock, so as to allow the under framing (which receives the  
" shock) to move forward under the bodies without carrying  
" them along with them, as is the case when they are rigidly  
" bound. By this means passengers seated within the carriage,  
" although they may be subjected to a somewhat rude shock, will  
" not incur any serious personal injury in the event of a col-  
" lision."

The inventors state that the mode which they prefer of effecting this object consists in providing the under framing of the carriage with grooves, in which the body is capable of sliding backwards and forwards, but is kept in place when in ordinary work by bolts, which are sufficient for that purpose, but which will yield and be broken if subjected to any extraordinary strain, and in order to ensure the breaking or severing of the bolts, they may be passed through holes made in steel plates let into the woodwork of the framing. The bodies may also be provided with buffers at the ends to lessen the shock. It will likewise be desirable that a luggage truck or van, or empty frame, provided with buffers, and a grooved framing should be placed between the engine and the first carriage of a train, in order that in the event of a collision, the body of the first carriage may be driven partly or wholly on to it. Instead of bolting the body of the carriage to the framing it may be merely placed thereon, and strong iron plates be fixed upon the sides of the carriage, such plates projecting over the framing, and being secured thereto by screws of such size as to break or tear out of the frame in case of a collision. Or instead of the plates being screwed to the frame, the latter may be grooved, or have a bar screwed on at each side, bolts passing through the plates and pressing against the frame with sufficient force to keep the body in its place under ordinary circumstances, but allow it to move in case of a collision. The body may also have a plate at each end, which will tear away on the application of a certain force; or the buffers in case of a collision might displace a bolt or other means of retaining the body in position. And the carriages or frames may also be provided with supplementary buffers, which should come into play when the ordinary buffers have been driven home, and when the bodies of the carriages are sliding on the frames.

[Printed, 4d. No Drawings.]

A.D. 1865, December 16.—N° 3259.

LONGRIDGE, JAMES ATKINSON.—“Improvements in loco-  
“ motive engines.”

This invention consists in the application of apparatus to locomotives, whereby the load on the driving wheels can be varied at pleasure while the engine is running, thus enabling the driver to vary such load as may be required. “In ascending an incline he will be enabled to increase the load on the driving wheels, and again, while running on levels or down inclines, to reduce and distribute it more evenly between the driving and non-driving wheels of the locomotive.” The framework of the locomotive is either suspended from the springs by links or other connections of which the tension and weight on the springs can be readily increased or diminished, or a variable connection may exist between the axle boxes of the driving wheels and the middle of the springs. For example, nuts and screwed rods may form such connections, the nuts having upon them toothed wheels, in gear with which endless screws or worms may be placed, and actuated by a hand wheel and cross shaft or other suitable means. Or instead of endless screw gear, toothed or other gear may be employed, and in place of nuts and screwed rods toggle joints or other mechanical equivalents may be substituted. When four driving wheels are used, the patentee mounts a “balance lever” on each side of the locomotive, immediately over the spring, and applies the adjustable connection between the fulcrum of such lever and the middle of the spring, the ends of which are connected with the locomotive frame as usual. The ends of the balance lever, which extend beyond the length of the spring, are placed in connection with the axle boxes by suitable rods. Instead of applying the apparatus directly in connection with the driving wheels, it may be made “to operate through the leading or trailing wheels of a locomotive with like effect.”

[Printed, 8d. Drawing.]

A.D. 1865, December 23.—N° 3322.

DUFRENÉ, HECTOR AUGUSTE.—(*A communication from Gerard Christian Heyning.*)—“Improvements in the permanent way and  
“ wheels of railways.”

The patentee mentions in the first place that a great defect has hitherto existed in the construction of railways as well as tram-

ways, consisting in the necessity for giving a radius of considerable length to the curves to be run over, this arising from the system of fixing wheels of equal diameter upon one axle. He also mentions that this defect has been partially obviated by using wheels of conical form, and leaving a space between the flanges of the wheels and the rails, this arrangement, however, causing the rails to be subjected to a horizontal as well as vertical pressure, and increasing the oscillation of the carriages. He then states that the present invention consists in "constructing the wheels on " their circumference, with two, three, or more different diameters, " the largest being turned towards the axle, which diameters are " calculated in proportion to the radii of the curves to be run " over;" and, secondly, in so arranging the rails at such curves that different diameters of the wheels are brought to bear upon the inner and outer rails, in accordance with the radius of the curve, the rails being wider apart at the curves than elsewhere, and of different elevations, according to the radii of the curves and the different diameters of the wheels which it is desired to bring into action upon them.

[Printed, 10*d*. Drawing.]

A.D. 1865, December 30.—N<sup>o</sup> 3386.

THOMAS, DAVID WILLIAM.—(*Provisional protection only*).—"Improvements in breaks or apparatus for stopping or retarding " railway trains."

This invention has for its object the coupling of the whole of the breaks of a train of railway carriages together, " so that the " breaks may be applied from either end of the train by the conductor or engineman, without the work of turning the carriages " at their terminus (which hitherto has been the practise) to suit " the particular character of break now in use." And the invention consists, firstly, in providing two round, square, or flat bars of iron to each carriage, of suitable size, having the ends flattened down and slotted in order to compensate for the action of the buffers, and being also provided with forked couplings for joining the break rods or bars together, the flattened ends of the bars being bent at right angles, and taking into a lever on the middle of the rocking shaft in the centre of the carriage. At each end of this shaft are double levers, attached to which are tapered rods, the ends next the break blocks " being turned at an angle, and " provided with holes of sufficient size to receive pins or bolts

“ attached to the break blocks, so that the ends of the tapered rods or bars may slide freely thereon.” Thus when a number of carriages are coupled together to form a train, the break rods or bars of the different carriages are also united by means of the forked couplings mentioned above, and by these arrangements the continuous line of rods or bars so formed will, upon being acted upon from either end of the train, operate upon the rocking shaft of each carriage, and by means of the double levers thereon, and the tapered rods or bars connected thereto force the breaks against the wheels of the carriages. The tapered rods may if desirable be attached to the break blocks by transverse pins or hinge joints, in which case the levers on the rocking shafts are shorter, and connected to the centres of the tapered rods by means of links, the result in either case being that on the movement of the rocking shafts, the tapered rods force the breaks against the wheels, these rods being arranged in pairs, at each side of the carriages, and the lower ends of each pair being pressed in opposite directions in applying the breaks.

[Printed, 4d. No Drawings.]

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A.D. 1866, January 4.—N° 30.

VICKERS, THOMAS EDWARD.—“ Improvements in machinery for rolling hoops or tyres for wheels or other purposes.”

This invention consists “ in so arranging a rolling mill that the parts of the rolls between which the work is performed are made to overhang their bearings, and the remaining parts of the rolls, instead of being placed side by side or one above the other, as is usual, are extended in opposite directions, so that the hoop to be rolled or the work to be performed may be placed and confined between collars or flanches, of which only one is upon each roll, and which flanch from its position may pass if required up to or beyond the centre of the other roll.”

A machine is described as being adapted for rolling hoops or tyres for railway wheels, in which a flanchèd inner roll is used to operate upon the inside of the hoop or tyre, while a second flanchèd roll forms the outside or periphery of the tyre. The face of each of the flanches is so arranged that when at work they are

at the same time in contact with the end of the opposite roll, thus enabling the working part of the rolls, or of one of them, to be made of small diameter, so as to be capable of operating upon a hoop having a small hole, say of only six or eight inches diameter in the centre, and having the outside diameter much greater, say three or four times as much. And as all the work is performed between the collars or flanches of the rolls, "all undue lateral spreading of the tyre will be prevented." One of the rolls is to be made moveable, by hydraulic or screw or other known power, "so as to give the tyre or hoop the required pressure, and allow it to be put on or taken off the inner roll."

The invention includes "applying driving power separately and independently to the rolls," so that the speed of each may be varied according to circumstances; and as the driving ends of the rolls project from the opposite sides of the machine, this separate driving of the rolls may be effected without difficulty or complication of parts. Any suitable arrangement of gearing may be employed for the purpose, no particular arrangement being set forth.

[Printed, 10d. Drawing.]

A.D. 1866, January 9.—N<sup>o</sup> 67.

MACRUM, JAMES MARIUS.—(*A communication from John Davis.*)—"Improvements in breaks for railway and tramway carriages."

According to this invention "the breaks are applied to the wheels of the vehicle by the action of a coiled spring, or of elliptic or other suitably shaped springs, or of a weighted lever in combination or not with a spring, and are held out of contact with or free from the wheels by the tractive power exerted upon the vehicle."

An arrangement is described in which the frame, the axles, the wheels, and the breaks of a carriage are all of the ordinary character, the latter being outside the wheels, and the break on one side of each wheel being connected by means of a cross bar to the corresponding break on the opposite side of the carriage, the cross bar being supported by hangers, and the two breaks being thus moved to and fro in unison. Mounted in supports in the carriage framing is also a shaft, which the patentee terms a "spring shaft," there being connected to this shaft one end of a coiled or spiral spring, the other end of which is secured to the inside of

a cylindrical case in which the spring is enclosed, this spring, when wound up, having a tendency to turn the shaft round. On this shaft are also arms or levers, from which proceed rods to the ends of arms mounted upon the ends of vertical shafts, carried in suitable bearings, and on the lower ends of these shafts are other arms from which rods extend to the break bars, the result of the whole arrangement being that on the coiled spring being at liberty to act, the spring shaft is slightly turned, and the arms or levers thereon so operate upon the other parts mentioned that the breaks are pressed against the wheels. From the arms already mentioned as being upon the upper ends of the vertical shafts, however, proceed other rods which are connected to the draw bars of the carriage, and thus, when either of those bars is brought into operation in drawing forward the carriage, the action of the coiled spring is resisted, and the breaks kept apart from the wheels, the breaks always, however, being brought into action in the event of the engine ceasing its proper motion, or any undue impulse being given to the carriage. In order to keep the coiled spring out of action, if it should seem at any time needful, a ratchet wheel is fixed thereon with which a pawl may be placed in gear, such pawl being again released when requisite by means of a short cord, connected to a longer cord which is under the control of the engine driver. When the breaks are not in action they are maintained at an uniform distance from the wheels by means of springs. Instead of the coiled spring, with its shaft and arms or levers, a certain cam and lever combined with an elliptic spring may be employed. The breaks may, moreover, be placed out of action by means of a hand lever and chain, the latter being connected to one of the levers on the vertical shafts already mentioned.

Other modifications of the invention are described, different arrangements of elliptic and other springs, horizontal and vertical levers, and other details being employed, in one case a weighted lever being used, either with or without a spring, in applying the breaks. The main features of the invention are, however, in all cases the same.

[Printed, 1s. 6d. Drawings.]

A.D. 1866, January 12.—N<sup>o</sup> 103.

SMITH, JOSIAH TIMMIS.—(*Provisional protection only.*)—"Improvements in moulds for casting the tyres of railway wheels and other annular and cylindrical articles."



According to this invention a mould for the casting of railway wheels and other articles is formed of "two semicircular halves, " jointed together and capable of opening and closing in the " usual manner," there being in the interior thereof a lining of fire-clay, and such lining having internally the figure which it is designed to communicate to the outside of the casting. The lining itself is made by moulding, and burnt in a kiln before being used. A core, when such is required, is also made of fire-clay, suitably burned, and that part of the bottom of the mould in which the core is fixed, and on which the metal is cast, is of the same material, with which the top of the mould may if desirable be covered or lined also.

The inventor states that castings made in moulds thus formed are not cooled so rapidly on the outside as when made in moulds of metal, and that they are therefore more homogeneous and less likely to crack than castings made in such moulds.

[Printed, 4d. No Drawings.]

A.D. 1866, January 15.—N<sup>o</sup> 127. (\* \*)

COMFIELD, THOMAS, the younger.—(*Provisional protection not allowed.*)—"Stopping and preventing slip from wet rails of locomotives and railway trains, and stopping carriages generally " and equalizing force without fly wheels."

By an "arrangement of valves" in connection with the "cylinders of locomotives" and "the momentum steam chest" the pistons "reverse the nature and effect of their action without " reversing the direction of their motion;" this reversed action is maintained "at the expense" of the momentum of the engine "and its load brings the same to a standstill."

By an arrangement in the permanent way and of a "galvanic current" the inventor prevents "the slipping of those wheels " upon whose revolution the action of the retarding piston " depends." "This reversed action" causes "the steam received " from boiler" to be "returned thereto through the momentum " steam chest."

By an "arrangement of conducting pipes containing water " connected with a double-acting cylinder, and having taps," the train may be stopped.

By an "arrangement of vulcanized india-rubber, an absorbent " material means for drying same and heated air," the inventor prevents the slip which occurs from wet rails.

By having "an equalizing cylinder acting substantially as the driving cylinder herein described, and whose power of equalizing speed exceeds the extremes of the variations to be equalized" the inventor dispenses "with the use of fly wheels."

[Printed, 4d. No Drawings.]

A.D. 1866, January 17.—N° 156.

KENNEDY, JOSEPH, and STANLEY, RICHARD.—(*Provisional protection only.*)—"Certain improvements in railway breaks."

In this invention bars or levers are suspended beneath the flooring or basement of each railway carriage, break blocks being secured to such bars or levers, and the latter being also connected to horizontal surface levers having their fulcra in brackets secured to the carriage frame. These levers project from their fulcra towards each other, so as to overlap and bear one upon the other, or their extremities may be connected by a pin running through a slot, which will allow them slightly to move when acted upon so as to force the break blocks against or remove them from the wheels. Between the horizontal surface levers and the bottom of the carriage are strong springs, which, when permitted, will so act as to cause the break blocks to be pressed against the wheels, transverse shafts carrying cams or segments being so arranged that the latter, by the action of the draw bars, are made to operate upon the surface levers and withdraw them from the wheels, the parts then being retained in that position by spring catches which act upon certain outside levers, from which they are removed when desirable by means of a longitudinal rod capable of being moved by the engine driver, each carriage being furnished with such a rod, and the rod of one carriage being connected to that of another by swivel joints and other suitable apparatus by means of which the whole may be moved simultaneously.

[Printed, 4d. No Drawings.]

A.D. 1866, January 18.—N° 168.

SPENCER, GEORGE. — "Improvements in vulcanized india-rubber springs for use in railway and other engines, carriages, and trucks, and for other purposes."

This invention consists, in the lateral expansion of cylinders of india-rubber of limiting the amount of stroke to one arrangement the patentee moulds the outer circumference of such a cylinder or rings of metal, such ring or rings space or spaces of sufficient capacity of india-rubber which is outside of the cylinder at the end or ends of the cylinder or cylinders. Two methods may be combined by the use of besides the cup plates which are placed at the outer circumference of the cylinder. A series of these cylinders is used to form a groove in the outer circumference of the cylinder. A bead or beads may be moulded in the inner edge of the cup plate or plates to be retained in position; or the groove may be retained in position with, and the surface of the cylinder in such cases either fitting the cup plate being so retained in position, or being so retained in position. The india-rubber may be solid, or it may be suitable for the reception of a buffer. The hole may be of the same size as the hole of the rod and be provided with guide for the cylinder in a position central to the rod. It may be either cylindrical or otherwise. The invention is mentioned as forming an improvement in the Patent which Patents were granted to the Patentee on February 2nd, No. 13,951, and A.D. 1852.

A second part of the invention consists in the use of metal wires embedded in such cylinders. The third part of the invention consists in the use of "fining rings, such as are known as" "him on June 28th, 1852, No. 14,151" "in cylinders of india-rubber," to form a groove in the outer circumference of the cylinder as patented by S. Moulton on Jan. 1st, 1852, No. 14,151.

These springs may be used either alone or in combination with engines, trucks, and carriages, "or" "under frame of carriages and the

" by George Attock on August 31st, 1863, No. 2145, or as  
" lifting springs attached to the chains or ropes of cranes or  
" lifts."

[Printed, 10d. Drawing.]

A.D. 1866, January 20.—N° 182.

KAULBACH, REINHOLD EDWARD. — (*Provisional protection only.*)—"The improvement of the wheels of carriages, waggons, trucks, and other rolling stock in use on railways, excepting those of breaks and locomotive engines, whereby the traction power of the latter is relatively greatly increased."

This invention relates to railway passenger carriages, waggons, and other vehicles in use on railways, but not to engines or break carriages, and consists in "a diminution of the adhesive surface of the wheels of the aforesaid carriages, waggons, and other rolling stock, and consequently of their friction upon the rails, whereby the adhesion and traction power of the locomotive engine are proportionally increased."

The invention is carried into effect by forming the tyres of the wheels, on the exterior, of "a very fine egg shape, so that the bearing of each wheel upon the rail is reduced almost to a mere point," a certain curve on one side of the egg-shaped part serving to strengthen the flange. Tyres thus shaped may be made of steel, hardened iron, or a combination of the two, or they may be composed of any metal that may be deemed most appropriate. Such tyres may be applied to existing wheels by being heated and shrunk on in the ordinary manner, and in order "to render the principle more effective" it is desirable that the working surface of the rail should be perfectly flat, so as "to augment as much as possible the adhesion of the driving wheels."

[Printed, 6d. Drawing.]

A.D. 1866, January 20.—N° 196.

THOMAS, WILLIAM, the younger. — (*Provisional protection only.*)—"Improvements in machinery for making moulds for casting metals."

This invention relates more particularly to the making of

This invention consists, in the first place, in confining the lateral expansion of cylinders of india-rubber used as springs, and of limiting the amount of stroke to be used in such cylinders. In one arrangement the patentee moulds a groove or grooves in the outer circumference of such a cylinder, in order to receive a ring or rings of metal, such ring or rings being formed with a cup space or spaces of sufficient capacity, or nearly so, to receive the india-rubber which is outside of the cup; or a cup plate is placed at the end or ends of the cylinder or ring of india-rubber; or these two methods may be combined by placing cup plates at the ends besides the cup plates which are carried by the grooves in the outer circumference of the cylinder. In other cases a metal plate is placed at each end of the cylinder, especially in cases where a series of these cylinders is used to form a spring. Instead of a groove in the outer circumference of the cylinder a projecting bead or beads may be moulded thereon, and a groove be formed in the inner edge of the cup plate or plates, so that it or they may be retained in position; or the grooves and heads may be dispensed with, and the surface of the cylinder be plain, the confining cylinder in such cases either fitting tightly upon the cylinder and being so retained in position, or being kept in position by pins. The india-rubber may be solid, or it may have a hole through it suitable for the reception of a buffer rod (for example), and the hole may be of the same size as the rod, or it may be larger than the rod and be provided with guide studs or projections to retain the cylinder in a position central with the rod. The cup plate may be either cylindrical or otherwise. This part of the invention is mentioned as forming an improvement upon the springs for which Patents were granted to the present patentee, A.D. 1852, February 2nd, No. 13,951, and A.D. 1853, July 22, No. 1733.

A second part of the invention consists in the use of spiral metal wires embedded in such cylinders of india-rubber; and the third part of the invention consists "in the combination of confining rings, such as are known as Coleman's, and patented by him on June 28th, 1852, No. 14,193, with metal wires embedded in cylinders of india-rubber," to increase their resisting power, "as patented by S. Moulton on Jan'y. 10th, 1861, No. 62."

These springs may be used either as buffer, draw, or bearing springs, alone or in combination with steel springs, for railway engines, trucks, and carriages, "or as body springs between the under frame of carriages and the body of carriages, as patented

" by George Attock on August 31st, 1863, No. 2145, or as " lifting springs attached to the chains or ropes of cranes or " lifts."

[Printed, 10d. Drawing.]

A.D. 1866, January 20.—N° 182.

KAULBACH, REINHOLD EDWARD. — (*Provisional protection only.*)—"The improvement of the wheels of carriages, waggon, " trucks, and other rolling stock in use on railways, excepting " those of breaks and locomotive engines, whereby the traction " power of the latter is relatively greatly increased."

This invention relates to railway passenger carriages, waggon, and other vehicles in use on railways, but not to engines or break carriages, and consists in "a diminution of the adhesive surface of " the wheels of the aforesaid carriages, waggon, and other rolling " stock, and consequently of their friction upon the rails, " whereby the adhesion and traction power of the locomotive " engine are proportionally increased."

The invention is carried into effect by forming the tyres of the wheels, on the exterior, of "a very fine egg shape, so that the " bearing of each wheel upon the rail is reduced almost to a mere " point," a certain curve on one side of the egg-shaped part serving to strengthen the flange. Tyres thus shaped may be made of steel, hardened iron, or a combination of the two, or they may be composed of any metal that may be deemed most appropriate. Such tyres may be applied to existing wheels by being heated and shrunk on in the ordinary manner, and in order "to render " the principle more effective" it is desirable that the working surface of the rail should be perfectly flat, so as "to " augment as much as possible the adhesion of the driving " wheels."

[Printed, 6d. Drawing.]

A.D. 1866, January 20.—N° 196.

THOMAS, WILLIAM, the younger. — (*Provisional protection only.*)—"Improvements in machinery for making moulds for " casting metals."

This invention relates more particularly to the making of



moulds for casting axle boxes, railway chairs, covers for insulators, and small toothed wheels, but may also be applied to the making of moulds for other and larger articles.

The mould box rests upon a horizontal table, made in halves, which are capable of separating from each other to permit of the passage of the pattern into the mould box, such halves of the table sliding upon and being supported by a quadrant bar fixed to the framing of the machine. On each side of and at a higher level than the table is a rail also fixed to the framing of the machine, upon which rails the mould box is supported and slides, projecting snugs on either side the mould box resting on the said rails. An opening is made in the bottom of the mould box of a size sufficient to allow of the passage through it of the pattern of the article to be moulded, and an empty mould box having been brought over the table is fixed by means of a locking pin on either side of the box passing through a hole in the rail and taking into a hole in a projection on the side of the mould box, the pattern to be moulded being fixed to a vertical rod or tube moved up and down by a lever. When a tube is employed its lower ends work steam-tight in a cylinder to which steam is admitted. The steam from the cylinder passes by the said tube to the pattern, the latter being hollow, and being thus kept warm. The pattern may be affixed to a plate, and the pattern and plate raised and lowered by the lever described. Above the mould box is a roller, the bottom of which is in a line with the top of the mould box. The roller is as broad as the table, and is carried by a reciprocating bar, the roller being made to traverse the open top of the mould box and press the sand therein. After the roller has moved across the box, and has made its return motion, a rammer having projections or teeth on its under side descends and rams the sand into the box, the arrangement being such that the rammer is raised and allowed to descend by the movement of the pressing roller. Scrapers may be attached to the shaft of the roller for clearing away the sand from the edges of the box, and in moulding large patterns the rammer may be connected to a swivel or joint, "to permit of the said rammer acting upon every part of the mould being formed."

Various racks, cams, and other mechanism are employed in carrying out the details of the invention.

[Printed, 4d. No Drawings.]

A.D. 1866, January 24.—N° 229.

EVANS, JAMES WILLIAM. — “Improvements in the construction of metallic cases or shells, for the reception of spiral springs and elastic substances for railway carriages and waggons, and other vehicles.”

This invention consists of cases for springs suitable for bearing and journal springs and draw and buffer springs, and relates to the application for these purposes of spiral springs filled with wool and other fibrous materials, “as patented by Perry Green Gardener, December 1st, 1863, and numbered 3007. The outer part or case is made of series of half cylinders with moveable interior pieces, pistons, or followers, formed with corresponding half cylinders, constituting together a cylinder or cylinders to receive and thus prevent the spiral springs packed with elastic substances from deviating from a straight line, and to reduce the length of the spring without the reduction of motion,” the improvements also relating to placing or mounting the cases, cylinders, or chambers (containing the springs packed with elastic substances) “on each side of the journal boxes, the parts being connected by a metallic bridge or yoke. Upon the side of each case or shell facing the journal box a recess is made to receive and retain hard india-rubber or other elastic substance, constituting the clip or sides of the seat of said spring cases, and which bear upon the journal boxes, and thereby to obviate and prevent injury to said cases containing the springs from the effects of shunting or other sudden concussion to the carriages or other vehicles, and also to cause easy ‘curving’ of the carriages.” “In the parts in which the ends of the spiral springs rest recesses are made the depth of the thickness or diameter of the metal spirals used and formed to fit the unground ends of the spirals.”

This invention is mentioned as being applicable to railway carriages, waggons, and other vehicles.

[Printed, 10d. Drawing.]

A.D. 1866, January 25.—N° 253.

WISE, FRANCIS.—(*A communication from Wilhelm Basson and Ferdinand Lüdecke.*) — “Improvements in the boxes or bearings of axles of railway and other similar carriages, and in the method of or arrangements for lubricating such axles.”

collars, or ratchet teeth and a pawl may be used in controlling the action of the parts.

[Printed, 4d. No Drawings.]

A.D. 1866, January 29.—N<sup>o</sup> 277.

DE WITTE, GERARD.—(*Provisional protection only.*) —“Improvements in the construction of breaks for carriages.”

This invention is described more particularly with reference to carriages drawn by animal power, but is applicable to other vehicles, “whatever may be the nature of the motive power employed.”

The invention relates to certain arrangements of mechanism whereby the retrograde action of the horse, or other power by which the vehicle is being propelled, applies the break blocks to the wheels. An iron bar is placed beneath the pole of the carriage, and so as to be capable of moving longitudinally in guides, and acting upon a cross bar to which the break blocks are attached. The forward end of the longitudinal bar is connected with the harness of the horse, or with the other moving power, in such manner that upon any retrograde movement or backward pressure of the latter the said bar is actuated, the other end of that bar being articulated by means of a segment or plate or other analogous contrivance to a corresponding plate or contrivance on one end of a second longitudinal bar or shaft, which latter has at the other end thereof the transverse bar or shaft carrying the break blocks. The last-mentioned segment or plate is provided with a slot, through which passes a pin fixed by any suitable arrangement to the carriage, and upon which pin the said segment or plate will freely turn. Upon the recoil of the longitudinal bar the break blocks carried by the transverse bar are pressed against the tyres of the hind wheels, such pressure being equally imparted to both wheels whatever may be the position of the front carriage by reason of the articulation mentioned above; a spring being so arranged as to restore the break blocks to their first position immediately on the ceasing of the backward pressure. By the use of levers, such as commonly used for similar purposes, additional break blocks may be applied to the opposite portions of the tyres of the wheels. And in order to prevent the breaks from being applied to the wheels when it is not desirable that they should be so, a bolt plate is fixed to the shaft carrying the transverse bar

and break blocks, such bolt plate having a hole or aperture formed therein for the passage of the pin upon which the said segment or plate attached to the said shaft works, as before mentioned, a pedal within reach of the driver or some other attendant of the vehicle being so arranged as to act upon a series of jointed levers, and so lift the bolt plate until the pin passes through the hole or aperture therein and thus locks the whole of the mechanism, which will not resume its normal condition until the pressure is removed from the pedal, when the bolt plate is restored to its original position by the action of a spring suitably placed. And in order to prevent the break blocks from being displaced by the pressure of the wheels upon the tyres or peripheries of which they are forced they are tapered, "that is to say, are made of less transverse diameter at the bottom than at the top, so that the pressure of the wheels is calculated to retain them in the block holders attached to the before mentioned transverse bar, and in which they are fitted and held by corresponding dovetails, all necessity for bolts or screws being thus dispensed with."

[Printed, 4d. No Drawings.]

A.D. 1866, January 29.—N° 284.

CHAPLIN, ALEXANDER. — "Improvements in locomotive engines designed for ascending steep inclines."

This invention relates to giving increased tractive power to locomotive engines meant to ascend steep inclines, by so constructing and arranging the wheels of such engines that they may have a greater hold or "bite" upon the rails than the wheels of engines as usually constructed, and the invention consists in using double flanged wheels, "the inner sides of the flanges being curved and inclined towards each other so as to embrace the upper edges of the rails, and having a channel between them narrower than the upper surface of the rail, so that the wheels do not bear upon the centre or upper surface of the rail, but only upon the upper edges of the sides of the same," the tractive power or "bite" of the wheels upon the rails being increased in proportion to the curved inclination of the flanges or the angle at which they bear upon the rails.

In order to provide for slight variations in the gauge of the rails upon which an engine may be travelling the wheels are not keyed fast upon the axles, but are mounted thereon by means of

two or more feathers and grooves, there being on each side of the boss of each wheel a washer or washers of india-rubber or other elastic material, confined to a certain extent by collars, but so that the wheel can move slightly on the axle longitudinally. And in order to accomodate the movements of the wheels to curves in the rails the axles are each divided in the centre, and each half is driven separately from the other through the medium of gearing and clutches, the latter being so arranged that they give way when a certain amount of strain is brought to bear upon the wheels, or so as to be thrown out of gear when requisite by means of levers worked by hand. All the wheels on the same side of an engine may, however, be coupled together.

[Printed, 8d. Drawing.]

A.D. 1866, January 30.—N° 289.

SHAW, HENRY.—(*Provisional protection not allowed.*)—"Improvements in the means and apparatus of communicating motion or power from the engine of a train to any part of the train."

"From the part of the train at which it is desired that a motion or power should be made or exerted, a steam pipe is laid to the engine boiler, with flexible or telescopically extensible joints therein for passing from carriage to carriage; the steam can be then applied to make or exert the motion or power that is desired by using a cylinder and piston fed by steam from the pipe."

This apparatus may be employed to bring the breaks of the train into action, to lock and unlock the carriage doors, to move an index showing the passengers the name of the next station at which they will arrive, to work "Shaw's pneumatic railway break," and to turn on gas for lighting the carriages while passing through tunnels."

[Printed 4d. No Drawings.]

A.D. 1866, January 30.—N° 294.

STERNE, Louis.—(*Partly a communication from Edward Lindner.*)—"Improvements in buffers, draw springs, and bearing springs."

This invention relates, in the first place, to those buffers in which a plunger or piston on the rear end of the buffer rod works

in a box which is closed except for the passage of the rod. The patentee introduces discs of hard india-rubber, or vulcanite, or ebonite, between alternate rings of soft india-rubber, which are united to the discs during the process of vulcanization or otherwise. The hard rubber discs are of the same or nearly the same diameter as the inner diameter of the box, while the soft rubber rings are of smaller diameter. The inner periphery of the soft rubber rings is by preference V-shaped, and the outer discs of each apparatus are by preference solid, while the inner discs have an aperture through the middle, the space thus formed causing the apparatus to act as an air buffer. The spaces between the outside of the rings and the sides of the box may be filled with woollen waste or other suitable soft material.

Similar arrangements are applicable to the draw and bearing springs of railway carriages, an arrangement of the latter being described in which the plunger or piston may be dispensed with, one of the end discs being made to act as a plunger. And instead of the hard discs being composed of hard india-rubber, vulcanite or ebonite, they may be made of brass, iron coated with brass, or other suitable metal or material.

[Printed, 10d. Drawing.]

A.D. 1866, January 31.—N° 304.

DEFRIES, COLEMAN.—“Improved apparatus or means for securing the safety of persons travelling by railway trains.”

One part of this invention relates to “securing the doors of railway carriages when in motion, and thus preventing the numerous accidents which arise from passengers leaving a train before it has ceased to move.” To effect this a staple is fitted on the interior side of each carriage door, a rod or bar being passed lengthwise through the carriage, such rod or bar having upon it catches or rods at intervals, and the bar of one carriage being connected to that of another, when the carriages are coupled, “with a rigid joint.” The bar which is in the guard’s van carries a rack, into which gears a toothed pinion; or a lever is fastened on to it, the fulcrum of the lever being but a short distance from the bar, as the movement required is but slight. “The train having left a station, the doors being closed by the porters, the guard, by turning a crank or moving the lever causes the rods to move forwards or backwards (according to the



“ door, opening either in the in-  
“ riage at the ends thereof, in co-  
“ pended bridge of sufficient l-  
“ interval between the carriages  
“ panel does not come lower t-  
“ that he merely rises to permit  
“ will touch a spring bell before  
“ alarm the passengers by his  
“ There are guide cords of elastic  
“ that when the guard lets down  
“ of the cord, which is furnished  
“ opposite or fronting vehicle.  
“ with, and in such case metal  
“ jections of each carriage imm-  
“ chains on which the guard  
“ ropes or straps, which, being  
“ always sufficiently rigid to sto-  
“ panel before him.”

Another part of the invention  
noticed in another series of Ab

[Printed, 4d. No Drawings.]

A.D. 1866, Fe

Secondly, to "enabling rapid inspection and repairs" to be performed in such boxes, which is accomplished by connecting the upper and lower parts of such boxes together by bolts, which may be unfastened and removed "even whilst the vehicle is travelling "at full speed," such bolts, with their nuts, being double-threaded right and left in order to prevent "spontaneous unscrewing," being, moreover, packed with sap wood.

Thirdly, to the separation of the spent or used-up oil from the pure oil, so as to allow the former to be clarified, and consists in forming in the bottom of the axle box two receptacles, one for containing pure oil, and the other for collecting the impurities. The cover of the former is inclined downwards, so that the oil from the axle and bearing can only flow into the latter, from whence it is strained through small holes, and returned to the first receptacle in a clarified state.

Fourthly, to "ensuring the certainty of the oil feed," and consists in casting on the walls of the lever box slanting cheeks or lips, for the purpose of receiving cast brass cushion bearers, which are coated with plush or felt, and crossed by ordinary lamp wicks for the purpose of acting as oil suckers, these suckers being easily removed and replaced in case of damage thereto.

Fifthly, to enabling the axle bed or bearing to make the pressure of the burden weigh equally on all parts of the axle journal, this being effected by forming in the top of the bearing a semicircular cavity into which is fitted a convex rib on the cap of the box, "so that the bearing can oscillate on the rib in the longitudinal "direction of the axle," the bearing being "debarred from any "lateral motion."

Sixthly, to enabling the oil reservoir "to be of sufficient capacity for allowing a greatly increased distance to be run over "before a fresh supply of the lubricant is required," this being effected by forming the oil reservoir partly within the walls of the box, the cover inclining downwards towards the middle, so as to obtain a greatly increased capacity for holding the oil, the slanting position of the cover keeping within bounds the oscillations of the oil in the reservoir whilst the vehicle is in motion, and thereby preventing the oil from becoming thick.

The patentee mentions that he prefers the use of rape seed oil to that of any other lubricant.

[Printed, 10/7. Drawing.]

A.D. 1866, February 6.—N° 364.

**CLARK, RICHARD.**—(*Provisional protection only.*)—"Improvements in the construction and lighting of railway carriages."

This invention consists in the first place of a re-arrangement of the seats of railway carriages, which are suspended by preference from the roofs of such carriages, and disconnected from each other. In order to steady the seats, a chain, india-rubber cord, or band, "or other fastening not being rigid," is passed underneath or at the back of the seats, or attached to the fittings belonging thereto, such fastening being also attached to the carriage sides, roof, or floor, according to the shape of the particular seat requiring to be steadied, the object being to prevent any shock sustained by the carriage itself from being imparted to the seats.

As regards the lighting of carriages, the invention merely consists in preventing annoyance to passengers from the overflow of the oil from the lamps by placing a chamber filled with charcoal or other non-conducting material between the oil receiver and the burner.

[Printed, 4d. No Drawings.]

A.D. 1866, February 6.—N° 365.

**SMITH, THOMAS JAMES.**—(*A communication from François Haeck.*)—"Improvements in lubricating the axles and bearings of railway rolling stock and other machinery."

According to one modification of this invention there is placed below the journal of a railway axle a trough which is furnished with a cover, the latter constituting a kind of basin. In the sides of the trough are certain holes, and water is placed in the trough, which by the motion of the carriage is kept in a state of agitation, causing portions of the water to pass through the holes and into the basin, in which latter there is a greased pad, or a sponge, pressed constantly upwards by a spring, and so kept in contact with the journal, a spring being also placed under the trough. Thus a "continuous damping" of the journal is kept up. Two sides of the basin are enclosed by pieces of leather concentric with the journal, and surmounted, if required, with a pad of greased wool or other material, and at the upper part of each side of the basin is a spring also carrying a pad, these pads

touching the sides of the journal for the whole length comprised between the two shoulders, and such pads being so curved as to bring towards the middle of the journal the water stopped by them. In order to prevent the shoulders of the axle from throwing the water to a distance, certain shields are used, which revolve with the axle, and which direct such water into gutters and funnels by which it is returned into the trough. Water may be supplied to the latter, or to the basin, from a reservoir placed at the top of the axle box, such reservoir being narrower at the bottom than at the top, so as to prevent it from bursting in winter in case the water should freeze within it; such water passing from the reservoir by wicks, or by a filter pipe, which should be as near to the bearing and journal of the axle as possible, so that should the water become frozen in winter the first heat produced by the rubbing parts may melt the ice.

Other modifications of the invention are described, in some cases a sponge or pad being constantly pressed against the journal by a weighted lever; in other cases pads being used in combination with a lubricating roller, the whole being pressed against the journal by springs; a perforated grease cup placed in the bottom of the axle box, and scrapers, gutters, and other appendages being used as requisite. A "reserve grease box" is in all cases used, this being provided with a channel through which the grease may pass, but which channel is filled with sulphur, which prevents the grease from passing to the journal until the heat produced by the rubbing parts is sufficient to fuse or melt the sulphur. And a modification of the invention is described as being suitable for stationary and other engines and machinery in general.

[Printed, 1s. 6d. Drawings.]

A.D. 1866, February 7.—N<sup>o</sup> 369.

SCOTT, URIAH.—"Improvements in various parts of railway " and other carriages, some of which may be applied to other " purposes."

This invention relates, firstly, to "making adjusting and " check springs combined." A metal plate is fixed to the frame of the carriage, and a second plate to the top of the bearing spring, blocks of india-rubber being combined with these plates, one block being between them and the other on the top of the plate

attached to the carriage frame, a bolt passing through and blocks.

Secondly, to buffers. A case fixed to one carriage cylindrical blocks of india-rubber combined with rim, a wedge-shaped plunger upon the next carriage being in case of collision into the case containing the india-rubber metallic lining preventing the plunger from cutting rubber when so driven in.

Thirdly, to constructing wheels of metal or wood combined with india-rubber, felt, or other suitable material. India-rubber is in one case placed between the nave and rim which receives the inner ends of wooden spokes. In another case a tyre is formed of india-rubber with a metal rim. In another case the outside tyre of a railway wheel is india-rubber between it and an inner rim; and in other cases india-rubber is placed around the bolts which secure the tyre.

Fourthly, to making railway and other axles of metal or wood with india-rubber, felt, or other similar material. An axle is set forth as being composed of an inner shaft having a tube of india-rubber, there being upon this, again, a tube of metal for the reception of the wheels. And an axle for common roads is described in which a square tube of india-rubber on the axle is surrounded by a square tube of metal in which the carriage spring is attached.

Fifthly, to making springs for railway and other carriages of steel and iron, in combination with india-rubber, leather, or other suitable material. In one case two plates of steel have their ends secured in an outside cap, india-rubber being placed between the under parts of the plates inside the cap, and a wedge-shaped piece of metal into which a screw is turned at the outer end of the cap. In another case a tube of india-rubber surrounds a cylindrical piece of metal, the ends of which are plates partially surrounding the india-rubber. In another case a spring is composed of steel plates, connected by india-rubber or leather brace to a metal frame having "eyes" for bolts to work in."

Sixthly, to making body, spring, and break blocks of metal combined with india-rubber, felt, or other suitable material, such india-rubber or other material being combined with plates of metal in different modes. "They can be used to isolate break blocks in railway and

"road carriages, and also the axle box from the axle guard and "the springs from axles." A shackle is described in which an outside oval case of metal is lined with felt or india-rubber, metal bearings being placed inside the lining.

Seventhly, to causing carriage steps to open and shut by the action of the door, which is effected by means of a bent lever, one end of which is connected to the carriage door, and the other to a sliding socket from which a second lever proceeds to the step frame, a projection from the back of the step carrying a small wheel causing the apparatus to "send the step into the frame" when the door is closed. A modification is described as being applicable to a "ladder step."

Eighthly, to a fluted reflector for lamps, which does not require notice here.

Ninthly, to keeping carriage and other windows in any required position, and to preventing windows and doors from rattling, this being effected by means of a shaft having at the outer end a small wheel, and pressed in one direction by a spring, the whole being enclosed in a suitable socket.

Tenthly, to rollers for the window blinds of carriages, this part of the invention consisting essentially of a small wheel which is constantly pressed by means of a spring upon the cord which passes over the roller pulley, this causing the blind to remain in any position desired. A spring hinge "to assist in closing the "doors of carriages" is also mentioned, in which a block of india-rubber is compressed by a bolt between two metal washers in such manner as to produce the required effect.

[Printed, 10d. Drawing.]

A.D. 1866, February 7.—N° 374.

BRANDON, ALEXANDER HORACE.—(*A communication from Alfred Motteau.*)—(*Provisional protection only.*)—"Improvements "in the manufacture of axles for railway carriages."

According to this invention the body of the axle is formed of a series of bars of tough iron, "placed one against the other and "radiating towards the centre, but not welded together," this absence of welding forming "the fundamental property of these "axles." The form and number of the bars, as well as the manner of uniting them, may be varied.

The inventor states that these axles resist by their flexion and compression, and not by torsion only, as in the case of ordinary



axles, the sliding friction which is generated when the wheels are travelling round curves in the rails, such sliding friction being one main cause of the breakage of railway axles.

"The bars forming the central parts of the axle are welded together at their outer extremities next to the bearings, which are covered with a superficial coating of granular iron to form the said bearings."

[Printed, 4d. No Drawings.]

A.D. 1866, February 9.—N° 404.

ROCK, JAMES, the younger.—"Improvements in carriages and waggons with folding heads or coverings, and in carriage springs."

"This invention consists, firstly, "in applying springs made of steel, india-rubber, or other suitable material, either separately or in connection with hinges or joints, to the heads or coverings of landaus and other carriages and waggons made to open and shut (whether such carriages or waggons be used for the conveyance of passengers or goods on common roads or on railroads, for the purpose of raising or closing such heads, or coverings, or assisting to raise and close them, and whether such raising or closing be done simply by hand or with the aid of weights, levers, screws, or other machinery." These springs may be made of any convenient shape, and so placed that the moving parts of the heads or coverings, draw, press, or rest upon them when lowered, "the springs thus counterbalancing the weight of those parts and giving them a tendency to rise when required."

Certain handles, holders, pulls, or tassels are connected to the middle or other hoop sticks of the head, by which persons inside the vehicle may easily raise such head, the latter being then held up by means of props and certain framework or levers combined therewith, one arrangement being mentioned in which by a cross bar passing under the seat of a carriage, and certain levers, the weight of persons on the seat may be made available for raising the head. Weights may if desirable be used instead of or along with springs.

Another part of the invention consists in making carriage springs, of triangular, elliptical, or semi-elliptical form "in such manner that the strongest part of the springs shall be at the part farthest from the points of support and of attachment to

" the weight to be supported, contrary to the method hitherto followed." An arrangement of this kind is described as being adapted to the hinder part of a carriage for common roads.

[Printed, 8d. Drawing.]

A.D. 1866, February 9.—N<sup>o</sup> 409.

RUSSELL, GEORGE FITZJAMES.—"Improvements in the manufacture of wheels for vehicles, railway rolling stock, the propulsion of vessels, and other purposes."

This invention is applicable not only to the wheels of railway carriages, but to those of other vehicles, the principal object of the invention being "to make a wheel which may be put together or taken apart in a short space of time," every part fitting accurately when fastened. The patentee proposes to construct the spokes of such form "that their edges at the stock or nave of the wheel shall register together, their surfaces forming radii of a circle, their outer ends entering the felloes and having shoulders thereon, thus limiting the extent of their penetration into felloes, and affording a bearing between the surface of the shoulder and felloe. The felloes are made each with a projection at one end, and a recess at the other, so that when fitted together they fasten each other. The tyre is grooved or slotted on its internal periphery in order to receive the corresponding outer surfaces of the felloes, and prevent them from escaping laterally."

"In order to put the wheel together the felloes are first placed in the tyre, and then the spokes are inserted in the felloes and made to register at the nave, instead of being inserted into mortices in a stock as by the ordinary plan, then two semi-stocks (one on each side) are applied to the spokes, and tightened up by means of screw pins and nuts." The axle is secured in its position by means of a recess formed therein, and semicircular collars which fit into this recess and into the interior of the outer portion of the stock, these collars being compressed by a metallic cap screwed on the nave. In order to effect a more perfect tightening up of the stock and spokes, a layer or layers of gutta percha, india-rubber, or leather may be applied between them.

"For railway wheels the spokes should (by preference) be made in the form of segments for the sake of strength."

WINDY, —  
CHARLES.—(*Provisional prot*  
“ the construction of railway  
“ their axles, part of which im  
“ wheels.”

This invention consists in the spokes of railway and other wheels of which are rivetted on one side on the internal tyre, “or it is the centre parts are rivetted on the flange projected from the nave of the flange, which is of considerable thickness the axle instead of being formed are strengthened by being divided further asunder than the periphery also formed around the centre, the sections come together and are united also be thrown outwards on the “ that the tyre being undercut “ they will have additional length.

Instead of using discs for wheels other form may be used, these being connected to the flange on the axle. Or such spokes, as well as discs

In this invention there are adapted to the under framing of every railway carriage or vehicle swinging bars, the ends of which carry brake blocks, these swinging bars being placed at each extremity of the framing, and there being midway of such framing, and between each pair of running wheels, a vibrating cross shaft, one end of which carries a friction wheel which is meant to come into contact with the surface of the rail when required, the other end of the cross shaft being provided with a counterbalance weight which at other times keeps the wheel away from the rail, and also with a small grooved roller round which a chain is passed, the chain of one carriage of a train being connected to that of another by suitable means, and the arrangement being such that the guard, by winding a portion of chain round an upright shaft, may at any time cause the friction wheels to be forcibly pressed upon the rails, other chains being so arranged as to act at the same time upon the swinging bars, and force the brake blocks into contact with the wheels of the carriages. By a suitable arrangement of chains either the guard at one end of the train, or the stoker or engine driver at the other may actuate the apparatus, and thus in case some of the chains were to break, the rest might still be brought into action, while if the operation were effected from one end of the train only, the whole of the apparatus might be rendered useless.

The friction wheels may, if desired, be caused to act on the wheels of the train, instead of upon the rails.

[Printed, &c. No Drawings.]

A.D. 1866, March 3.—N° 645.

CLARK, JOHN.—(*Provisional protection not allowed.*)—"Improvements in railway brakes."

This invention "has for its object the applying of break blocks to the wheels of railway rolling stock in such a manner that the friction on the face of the block is the motive power for dragging the block home and completing the result." The inventor proposes "to suspend the blocks from radial arms or links from a fixed centre or fulcrum pin, concentric or nearly so to the respective wheels, the blocks on one side being used for the up and those on the opposite side for the down journey."

[Printed, &c. No Drawings.]

R. C.

A. B.

A.D. 1866, March

DEAKIN, WILLIAM, and JOHN  
*visional protection not allowed.*—

" material in combination with iron  
 " for the manufacture of tubular  
 " where great strength and lightness

The inventors mention, in the Letters Patent made by them on (year is not stated), No. 2795, relative to the same, in substance, as being for improvements in the Specifications granted to James Thompson on Jan. 1024, 1863: Nos. 139 and 2784, 1863, in which they chase the registered proprietors. A Letters Patent made by them in "May last," No. 2795, the said James Thompson on the 21st of May last.

They then proceed to state that in the first place, in producing tubular material of great strength and lightness are required, the material being treated "by the means of the operations in the Patents herein-before referred to," in the operations in connection with the material, "swaging, rolling, or otherwise operations," to give it to the shape and dimensions required, "irregular, together with the form of the journals, so that a tube, cylinder, or parts may be formed and fashioned into the desired, in one entire seamless kind."

[Printed, 4d. No Drawings.]

A.D. 1866, March

NEWTON, WILLIAM EDWARD  
*Samuel M'Cambridge.*—"Improvements in  
 " carriage brakes."

This invention consists in the use of carriage brakes by means of a belt or strap on one of the axles of a carriage, in combination therewith a chain or chains, such chain or chains being "or pulleys in connection with

" behind, and in such a manner as to effect the braking or " checking of the rear carriage of a train first, and the others so " on in succession until the front carriage is checked," various advantages being mentioned as attendant upon this system as compared with the usual mode of checking " the front carriage " first and the rear carriage last."

" Check blocks " are used which are connected by cross bars, and combined with certain longitudinal rods and levers, these arrangements, however, being all of the usual character, springs keeping the check blocks out of action when not required to operate. For bringing the brakes into action an apparatus is connected to the framing of the engine which consists of side pieces carrying shafts, on one of which is a pulley, round which the belt mentioned above passes, that shaft being mounted in moveable bearings, and being capable of being moved to and fro by excentrics fixed upon another of the shafts, the result being that not only is the belt tightened and the moveable shaft put into rotation, but a pinion on that shaft is also placed in gear with a wheel upon another shaft to which one end of a chain is connected which forms a part of the series of chains and connecting rods already alluded to, and by which that series is made to operate upon the brake levers and brakes. The details of the invention may be variously modified, and include the employment of certain adjustable stop rods with screwed ends, these being so arranged as to prevent " the slipping of the wheels."

Mechanism such as described above may be operated by hand, if desired, instead of by the belt and pulleys.

[Printed, *La. Drawings.*]

A.D. 1866, March 14.—N° 763.

BELLEVILLE, JULIEN FRANÇOIS.—" Improvements in the " construction and arrangement of springs."

This invention consists " in constructing steel and other springs " of the form of hollow truncated cones, open at both ends, and " in arranging such springs in couples in such manner that the " edges of their bases rest upon each other, in which position " they are held by means of a central bolt fitting easily into the " holes at the small diameters of the truncated cones. Such " pairs of truncated cones may either be used singly, or two or " more such pairs may be placed one above the other upon the " central bolt, so as to obtain any required amount of elas-



"ticity," "the degree of conicity  
 "eventually, if the pressure is suff  
 "form of two discs resting with  
 "other, in which position the doubl  
 "a block of metal, offering very g  
 "flexion." By these arrangements  
 "friction between the parts of the s  
 "moreover, be deteriorated "by de  
 "elastic limits."

1. "It is essential for the perfect act  
 "line which generates the surface of  
 "straight," and in order to secure  
 "duced by means of two dies, having  
 "required, between which they are stu  
 "hot state.

These springs are mentioned as  
 "ageous when applied as buffer, draw  
 "railway purposes.

[Printed, 8d. Drawing.]

A.D. 1866, March

MICHAUD, PIERRE. — (*Provisional*  
 "provements in the manufacture  
 "apparatus for the same, which ap  
 "the manufacture of railway buffers

As regards wheels this invention  
 "peculiar manner of combining the  
 "them together into one solid piece  
 "internal flange, and a boss also  
 "flange of considerable width, "  
 "spokes being then cut of suitable  
 "split or bifurcated, so that when the  
 "in their places the outer ends em  
 "inner ends that on the boss. The  
 "heated, and the whole welded toge  
 "machine which consists of a kind of  
 "able anvil on which the wheel is lai  
 "recessed to suit the form of one h  
 "of the hammer being recessed in a  
 "to operate upon the whole wheel of  
 "the boss and flange and a small

one part, where it must embrace the full length of the spoke, and an extent of tyre equal to rather more than the distance between the spokes at that point. The anvil is mounted upon a vertical axis, and the axis by which the apparatus is worked is provided with two cams, one of which works the tilt hammer in the ordinary manner, while the other operates upon teeth formed upon the circumference of the anvil, or upon a corresponding surface formed or fixed upon its axis, the anvil being thus caused to rotate in unison with the working of the hammer. The latter may operate by gravitation only, or be aided in its action by a spring.

In applying the invention to the manufacture of railway buffers it is used only when such buffers consist of iron discs forged on the ends of rods, such discs and rods being welded together as described above.

[Printed, 4d. No Drawings.]

A.D. 1866, March 19.—N° 813.

OSBORNE, CHARLES STANLEY. — "A new compound applicable to the lining or covering of bearings, steps, axle boxes, journals, and other frictional parts of machinery; also to the construction of pulleys, wheel tyres, screw propellers, and other like parts of machinery."

The compound which constitutes the essential feature of this invention consists of a mixture of "gun cotton" (or that produce which results from the action of a mixture of sulphuric and nitric acids upon cotton or other vegetable fibre) with a vegetable oil, either in its natural state or in the state known as boiled or oxidized oil, such compound being known as "parksine." And this compound is mixed for the purposes of this invention either with plumbago and steatite, in the proportion of half a pound of plumbago to one pound of parksine and one pound of steatite, or with plumbago, steatite, and sulphur, half a pound of each of the latter being combined with one pound of the parksine; benzole, wood naphtha, or some other suitable solvent being used to facilitate the mixture of the ingredients, and cotton or other fibrous material being incorporated therewith in order to give toughness and tenacity to the whole, the compound being then compressed so as to render it hard and solid.

Among the purposes to which this compound is mentioned as

being applicable are the manufacture of other carriage wheels, as well as axle boxes.

[Printed, 4d. No Drawings.]

A.D. 1866, March 25

MOULTON, STEPHEN.—(*Provisional*)

" improvements in the manufacture of  
" engines and carriages, buffers, and  
" This invention consists in " embedding  
" a hollow or solid cylinder of india-  
" metal or other suitable hard material  
" between metal or other plates, at such  
" each other in the cylinder as may  
" These rings, washers, or plates, give  
" of resistance to the india-rubber cylinder  
" spring. The rings, washers, or plates  
" with perforations, " so that the india-  
" uncured state may be connected  
" The whole mass is then subjected  
" to pressure, and the spring is complete."

[Printed, 4d. No Drawings.]

A.D. 1866, March 25

JOHNSTON, THOMAS, and RENFREW

" Improvements in arranging or connecting  
" or ways for carriages on common rail  
" According to this invention one of  
" of railway such as usually laid down  
" formed with a narrow groove towards  
" part of the rail or tram is flat, and  
" part of the tyre of each wheel of  
" which are to run on the line. The  
" side of the carriages enters the groove  
" carriages " are thereby guided along  
" the line is flat, and the wheels of the  
" have no flanges. " By this arrangement  
" carriages are guided and retained  
" Carriages with ordinary wheels, or  
" run with freedom on the lines, and

"shock owing to the narrowness of the groove in the rail or tram."

The flanged wheel is fast but the plain wheel is loose upon the axle, and the patentees mention that by these arrangements there is no possibility of the wheels jamming, "as in cases where both rails are grooved and the grooves very narrow."

[Printed, &c. Drawing.]

A.D. 1866, March 26.—N<sup>o</sup> 886.

RICHARDSON, JAMES, and TAIT, JOHN.—(*Provisional protection only.*)—"Improvements in breaks or mechanism for retarding and stopping railway and other carriages."

According to this invention each axle of a railway or other carriage is provided with a right and a left volute or scroll cam, one of which is meant to be used when the carriage is travelling in one direction, and the other when such carriage is moving in the reverse direction. The breaks themselves are of the ordinary character, and are provided with links, duplex levers, and cross shafts for actuating them in the usual manner, except that upon each cross shaft two longitudinal levers are placed, the free ends of which are capable of moving transversely and horizontally over the ends of the volutes or cams, so as to be brought into contact with them and removed therefrom at pleasure, these operations being effected by various mechanical means, one of which consists in placing a light longitudinal shaft below the centre of each carriage, which is made to act upon the free ends of the levers, when turned partially round on its bearings, through the medium of lateral links or rods, ratchet or toothed racks and wheels, and other mechanism. The longitudinal shaft of one carriage is connected to that of another by "quarter lap" couplings or other simple joints, or by forming each shaft in two parts, connected by a "spring box." The result of these arrangements is that an attendant, by turning one of the longitudinal shafts of a train, may bring one lever of each carriage over its proper cam, according to the direction in which the train is moving, each cam then gradually raising its lever and so applying the breaks. In place of the longitudinal shafts being made to act upon the levers through the medium of links and racks and gearing, as mentioned above, they may be made to operate upon them by means of duplex levers, one end of each being moved by a short screw barrel upon the longitudinal shaft, or by a spring which is

allowed to act by the movement of a tooth or rane on the scroll. The levers may be removed out of contact with the scroll or by slightly backing the train, or by chains proceeding to winding barrels on the longitudinal shafts, all of which arrangements may be variously modified, as well as the arrangement of the scroll cams themselves and the levers upon which they act, the details of the invention being set forth at very considerable length.

(Printed, &c. No Drawings.)

A.D. 1866, April 5.—N° 971.

MORGAN, RICHARD DOUGLAS.—*Provisional protection* to—*"Improvement in the coupling of railway carriages, trucks, or vans."*

According to this invention railway carriages and other vehicles may be connected to and disconnected from each other by means of a lever handle on one side or the other of such carriage or vehicle, the arrangements being such as to obviate the necessity for a person passing between such carriages or vehicles in order to connect or disconnect them.

"The drawbar, as at present used, may be adapted for the purpose of this invention, by means of a pin hole in the end thereof. Through this hole, and at right angles with the drawbar, a round or square bar of iron or other suitable material is passed, so as to extend from one side of the carriage, truck, or van to the other, passing through the hole and projecting far enough to receive a lever or handle, with proper fastening or stop and flange." This handle and lever are connected with a "combined hook and loop," the arrangement being such that the movement of the handles and levers of two adjoining carriages will cause the combined hooks and loops of each to engage with or be disengaged from the other as desired, instead of the present dangerous way of going between the trucks."

A truck, carriage, or van may have the ordinary coupling attached thereto, as well as the coupling described above.

(Printed in Drawings.)

A.D. 1866, April 6.—N° 289.

DE GABLENZ, ANTOINETTE BABON.—*Provisional protection* to—*"Improvement in a method of coupling carriages, trucks, or vans."*

" running shafts and axletrees of machines and vehicles of all descriptions."

The object of this invention is to reduce the friction attendant upon the usual mode of arranging the axles and shafts of carriages and machinery, and the invention consists in so constructing the bearing that the axle or shaft "is not subjected to any direct friction," this being accomplished "by furnishing that part of the shaft or axle that is usually laid down in bearings with a ring or collar, the circumferential surface of which may be either convex or concave, and bearing respectively upon a projecting ring or a groove upon or in a circular movable plate connected with a corresponding stationary plate by means of a central stud or pin. Between these two plates a number of antifriction balls or spheres, held at a proper distance apart by a corresponding number of radial arms mounted upon a central pivot, are inserted for the transmission of the rolling motion and reduction of the friction."

Different modifications of the invention are described, the invention being mentioned in particular as supplying a substitute for the axle boxes commonly in use in railway carriages, locomotives, and for other similar purposes."

[Printed, *ed.* Drawing.]

A.D. 1866, April 7.—N<sup>o</sup> 996.

KENDALL, CHARLES.—(*Provisional protection only.*)—"Improvements in atmospheric railway breaks and communications."

The inventor states in the first place that this invention relates to that description of railway break and communication "which shall be worked by the aid of the atmosphere," assisted in the performance of its function by the specially adapted appliances set forth in the Specification of a Patent granted to the present inventor A.D. 1864, No. 3083. According to that invention a receiver was made to contain a quantity of condensed air, and the pump which supplied such air was arranged in connection with certain striking gear, "an appliance constructed for the purpose of throwing the action of the pump from a tight to loose gear, and so saving such ordinary pump from unnecessary friction." In the present invention the arrangement consists of "a vertical single-action three-throw force air pump, placed



allowed to act by the movement of a  
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 the details of the invention being  
 length.

[Printed, 4d. No Drawings.]

A.D. 1866, April 6

MORGAN, RICHARD DOUGLAS.—  
 —"Improvement in the coupling of  
 "vans."

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 may be connected to and disconnected  
 a lever handle on one side or the  
 vehicles, the arrangements being such  
 for a person passing between such  
 to connect or disconnect them.

"The drawbar, as at present used  
 "purpose of this invention, by means  
 "thereof. Through this hole, an  
 "drawbar, a round or square bar  
 "material is passed, so as to extend  
 "riage, truck, or van to the other,  
 "and projecting far enough to receive  
 "proper fastening or stop and fence  
 are connected with a "combined handle  
 ment being such that the movement  
 two adjoining carriages will cause the  
 of each to engage with or be disengaged  
 sure, "instead of the present danger  
 "trucks."

A truck, carriage, or van may  
 attached thereto, as well as the coupling

[Printed, 1s. Drawings.]

A.D. 1866, April 6

DE GABLENZ, ANTOINE BARNARD.—  
 only.)—"Improvements in anti-

" running shafts and axletrees of machines and vehicles of all descriptions."

The object of this invention is to reduce the friction attendant upon the usual mode of arranging the axles and shafts of carriages and machinery, and the invention consists in so constructing the bearing that the axle or shaft "is not subjected to any direct friction," this being accomplished "by furnishing that part of the shaft or axle that is usually laid down in bearings with a ring or collar, the circumferential surface of which may be either convex or concave, and bearing respectively upon a projecting ring or a groove upon or in a circular movable plate connected with a corresponding stationary plate by means of a central stud or pin. Between these two plates a number of antifriction balls or spheres, held at a proper distance apart by a corresponding number of radial arms mounted upon a central pivot, are inserted for the transmission of the rolling motion and reduction of the friction."

Different modifications of the invention are described, the invention being mentioned in particular as supplying a substitute "for the axle boxes commonly in use in railway carriages, locomotives, and for other similar purposes."

[Printed, *ed.* Drawing.]

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KENDALL, CHARLES.—(*Provisional protection only.*)—"Improvements in atmospheric railway breaks and communications."

The inventor states in the first place that this invention relates to that description of railway break and communication "which shall be worked by the aid of the atmosphere," assisted in the performance of its function by the specially adapted appliances set forth in the Specification of a Patent granted to the present inventor A.D. 1864, No. 3083. According to that invention a receiver was made to contain a quantity of condensed air, and the pump which supplied such air was arranged in connection with certain striking gear, "an appliance constructed for the purpose of throwing the action of the pump from a tight to loose gear, and so saving such ordinary pump from unnecessary friction." In the present invention the arrangement consists of "a vertical single-action three-throw force air pump, placed

" inside the guard's van, provided with specially adapted mechanism by the action of one or other of which the action is regulated.

Another part of the invention relates to carriage wheels, and consists in adapting the invention thereto. In this case the patentee proposes that "the cylinders be made laterally," and so that one piston may be made larger than the other, and "placed in the centre of any two sets of wheels." By additional rods being added to those rods already existing, a larger piston all four blocks on that side will be put into play, and leaving double the area of the smaller piston. On the other side, the action of the whole will be performed with equal pressure."

According to another part of the invention a cylinder is placed vertically underneath the break van, and "packed with air" or plunger supplied with a spiral spring for re-acting. It is connected with a lever, and attached to a weight shaft opposite to the lever now in use for operating the breaks," the inventor proposing that when the cylinder is charged with air the piston shall press upon the lever above, in addition to the lever worked by the ordinary mechanism. The advantage of this arrangement being "that there will be two systems of break power applicable," one of which will be available in case of failure of the other.

Another part of the invention relates to an arrangement by which the passengers in any carriage of a train may, by pulling a cord or tassel, sound a whistle or whistles, and draw the attention of the guard or engine driver when necessary.

[Printed, 4d. No Drawings.]

A.D. 1866, April 7.—N<sup>o</sup> 1001.

NEWTON, ALFRED VINCENT.—(*A communication to the Hon. the Lord Chancellor, in pursuance of an Act of Parliament, bearing date the 12th of August 1865, in relation to the subject of the said Act.*)—"An improved mode of and apparatus for manufacturing railway wheels and other articles of cast steel."

The object of this invention "is to produce articles of cast steel by subjecting this metal, while it is in a liquid state, to the action of steam in special moulds, to considerable pressure, for the purpose of expelling the air and rendering the steel more dense than it otherwise is, and free from blisters and other imperfections." The invention is described with special reference to the manufacture of railway wheels.

of railway wheels. A mould is used which is composed of three parts, these consisting of a lower section or base plate, in which the main body of the wheel is cast, and a part of the flange formed; next, a ring placed upon the base plate, and which forms the tread of the wheel and the remainder of the flange, and, thirdly, an upper part or section which produces the contour of the outer surface of the wheel, these three parts, when put together, forming a complete chamber or mould. The upper section is furnished with three or more elevations, having screwed holes in them for the reception of vertical screwed rods which extend some distance upwards, and have at their upper ends spur wheels, all of which are in gear with one central wheel capable of being turned by a hand lever, this part of the arrangement enabling the upper part of the mould to be raised or lowered at pleasure, the screwed rods and the wheels being supported by suitable framing, hooked screws and other apparatus being used to hold the parts of the mould together as may be requisite. Three or more "ingates," or passages for the melted metal into the mould, are formed in the upper section, these ingates being made "flaring," or widening downwards, in order to allow of this section rising readily when both mould and ingates are filled with metal, certain dovetail slides, arranged at the upper ends of the ingates, being used for the purpose of cutting off the upper ends of the "sprues" after the metal has been poured into the mould. Directly beneath each ingate there is made in the base plate a hole for the reception of a block of plumbago, or other refractory substance, which will prevent the liquid steel from melting the surface of the base plate and adhering to it at the points below the ingates, the blocks of plumbago being kept in position by set screws. A conical core is used for forming the hole in the wheel, such core being driven into the mould from the lower part of the base plate before the operation of casting commences. This being done, the screws mentioned above as being connected with the upper section are turned so as to forcibly depress that section upon the metal, condensing the latter and expelling from it air and gas, thus producing a wheel of great strength and toughness, and when the casting has "set" the movement of the screws is reversed, the upper section is raised, and the other parts of the mould separated so as to allow of the removal of the wheel therefrom.

[Printed, 10d. Drawing.]

A.D. 1866, April

BRANDON, ALEXANDER HORN  
*Alexander Watson.*)—"Certain new

" springs, which are particularly  
 " springs, but may be applied to other

This invention consists in "the  
 " curved in sections of any equal

" inwards, the curves in each side

" and the ends a short section of

" straight line from the ends so as to

" curve," the result being that "the

" sarily fall within the middle of

" each pair of plates or leaves will

" to say, in a direction opposite

plates tending to straighten towards

direction, this producing "the ap

" lengthening the spring or raising

" the spring." The invention also

binding these springs in frames, in

or leaves "shall stand vertically on

" the frames, and in corresponding

" opposite sides, so that the pressure

" tical straight line upon the ends

" and the elastic action will, owing

" curves and their position in oppos

" each pair from each other." The

so constructed as to interlock at

joint, a space being left between them

for the play or elastic action of the

grooved to receive the ends of the

in position.

The details of the invention may

character may be applied not only

cles for common roads.

[Printed, &c. Drawing.]

A.D. 1866, April

EDWARDS, WILLIAM YOUNG.—

" Improvements in axles and axle

" other conveyances running upon

In one part of this invention the ends of the axles are ribbed or fluted in the direction of the length thereof, such ribbed or fluted ends being placed in boxes which are free to run within the hubs or boxes of the wheels; "the interior of these loose boxes is smooth, whilst the exterior is ribbed or corrugated as described with respect to the axles. Or the axles, which are ribbed or fluted as above described, may work within the hub or box of the wheel without the interposition of a separate box."

Another arrangement consists in the application of rollers working between the axle and the interior of the hub or box of the wheel; "such rollers may be loose within the hub or box of the wheel, or they may be kept at suitable distances apart by working in suitable bearings."

"The arrangements above described are also applicable to the axles and axle boxes of railway rolling stock."

[Printed, 4d. No Drawings.]

A.D. 1866, May 4.—N° 1267.

GEDGE, WILLIAM EDWARD.—(*A communication from Léon Edouard Laurency.*)—(*Provisional protection only.*)—"Improvements in railway rolling stock, with the object of ensuring the safety of travellers."

This invention relates, in the first place, to the opening and shutting of the carriage doors of railway trains, and consists in the use of a small crank "placed plumb with each carriage door," a small vertical chain descending from each crank to a small moveable piece "hidden in the thickness of the carriage," and capable of entering a staple in the door, this moveable piece, in fact, forming a bolt which keeps the door shut. The apparatus of one carriage is connected to that of another by chains passing from carriage to carriage, and connected by small "splits" at the ends, these chains being ultimately connected to levers, one of which is placed on the last carriage and another on the tender, and by moving one or other of these levers the bolts may be raised from the staples so as to allow the doors to be opened. "The closing of the doors takes place of itself, the top and bottom hinge not being on the same line."

Another part of the invention relates to brakes for railway carriages, and consists in placing in front of each wheel a shoe containing three friction rollers, which together form a curve or arch,



the two upper rollers being larger than the shoe is lowered upon the rail the latter enters the shoe, "its flat part" follows its movement until it may slide on the rail without position by the tyre of the wheel ing between the friction rollers. The whole of the shoes or brakes action and withdrawn therefrom by carriage to carriage, and extending worked by the engine driver.

Another part of the invention collective engine of a train with a horizontal, and having coiled thereon rails " ' Vaucanson ' or band chain," should the engine driver perceive a train, he may, by releasing a pawl and using a " special guide " cause under the wheels of the engine and train from the line upon which he is line, where he may remain until the he may back his own train upon the tion, wind up such rails again upon before. A lantern signal is arranged drum.

Another part of the invention interior of carriages, but this will be Abridgments.

[Printed, 4d. No Drawings.]

A.D. 1866, May 4

WALKER, JOHN, and WARNER (protection only.)—"Improvement in other light materials into trucks on railways or other roads."

According to this invention "the ends of the trucks or wagons are worked by levers the cotton or other materials may be compressed into a bundle at each end of the truck or wagon."

" strength corresponding in size with the ends of the truck, wagon, or other carriage," to which the improvements are to be applied, and on this frame are mounted two horizontal shafts, one along the top and the other at the bottom, there being on each of these shafts two or more hollow rolls or barrels, capable of turning freely thereon. Across the centre of each frame is mounted another shaft, having thereon fixed drums or barrels corresponding with those on the top and bottom shafts, this shaft revolving freely in suitable bearings, and having on each end a ratchet wheel in gear with which is a pall mounted on the outside of the truck or wagon. This shaft may be caused to rotate by means of other palls which are made to act upon the ratchet wheels by means of levers, or by other suitable mechanism. " At the end of each fixed drum or barrel the end of a chain or rope is fixed, one of which passes under the bottom roller and along inside the bottom of the truck, the other end being made fast to a follower inside the truck; the other chain or rope passes over the top roller, and is fastened to the top of the said follower, so that when two or more chains or ropes are fixed and the middle shaft is turned round it draws the follower with the cotton or other light material close up to the end of the truck. Similar apparatus is applied to each of the end frames of the truck or wagon. The shafts may, if desired, be fixed on the ends of the trucks without employing the intermediate frames."

[Printed, 4d. No Drawings.]

A.D. 1866, May 5.—N<sup>o</sup> 1289.

STATHAM, HARRY, and COLLINS, BENONI. — (*Provisional protection only*).—"Improvements in or applicable to carriage, buffer, draw, and other springs."

This invention consists in constructing buffer and like springs of hollow forms of india-rubber, "by preference hollow rings, circular in form and section," the internal space being charged with air, such rings or other forms being placed in suitable numbers upon a rod or rods, and either so as to be in contact with each other, or with discs of metal interposed between them, or combined with solid rings or other forms of india-rubber, and enclosed in a case "or with hoops, as hitherto," light and durable springs being thus obtained.

In some cases the hollow rings are provided with small holes through which steam can be introduced into the interior, this arrangement being preferred where it is desirable to check the heat of the axle-boxes, and to render it less sudden."

[Printed, 4d. No Drawings.]

A.D. 1866, May 1

WISE, FRANCIS. — "Improvement in the journals of railway carriages."

This invention consists in forming the journals of railway carriages "of wood, or of its grain endwise, or nearly so, to be used with vulcanite, or vulcanite or other fibrous or non-metallic material united under pressure or otherwise in such manner as to contain water, so that the bearing surfaces may be cooled."

The patentee states that he prefers to use the axle boxes as reservoirs for containing the fluid, and to place therein rollers or other material, and cause them to be in contact with the journals, their ends being immersed in the water or other fluid, thus keeping the surfaces of the journals moist and cool. Or instead of carrying up the fluid to the journals; he partially immerses the journals up to the bearings, the surfaces being formed at intervals with spaces or grooves, so that it may be found desirable to connect the carriages of a train together by means of tubes, so that the whole or a part of the train may be in communication with a current of water or other fluid made to return by similar tubes to the reservoirs, or was originally drawn.

Different modifications of the invention are shown in the drawings.

cases the axle-box consisting of "two parts, dividing horizontally " or otherwise, as convenient." Treacle, salt, or other suitable material may be mixed with the fluid in the box in order to prevent it from freezing in cold weather.

[Printed, 8d. Drawing.]

A.D. 1866, May 15.—N° 1377.

PHILLIPS, JAMES EDWIN.—(*Provisional protection only.*)—  
"Improvements in axles for railway and other carriages."

In one part of this invention ordinary axles are each cut transversely into two parts, and turned down so as to fit into a tube which is placed over them. The ends of the tube come against the bosses of the wheels, and serve to maintain the distance between them and to give the necessary strength to the axle. The wheels are keyed to the two parts of the axle, the outer ends of the latter being supported in axle-boxes in the ordinary manner.

In another arrangement an axle is employed over which two tubes are placed, abutting against each other in the centre of the length of the axle. The wheels are secured to the outer ends of these tubes, the ends of the solid axle running in boxes in the usual manner, the outer ends of the tubes serving as shoulders against the boxes.

By these arrangements the wheels turn independently of each other, the turning of curves being thereby facilitated, and the wear and tear of both wheels and rails reduced.

[Printed, 4d. No Drawings.]

A.D. 1866, May 16.—N° 1392.

ELLIOTT, GEORGE AUGUSTUS.—(*Provisional protection only.*)—  
"Improved modes of and apparatus for opening and closing  
"railway carriage and other windows."

The chief object of this invention is to afford means of opening and closing carriage windows from the inside of the carriage by simply turning or moving a handle. A cranked handle is in one case connected to a pinion which is in gear with another pinion, placed upon a vertical rod having "a quick thread cut thereon." To the lower part of the window is fixed a bracket or matrix, in which is an aperture through which the threaded rod passes, there being projections inside the aperture which take into the thread

of the rod, the result of the arrangement being the threaded rod being turned by means of the handle the window is raised or lowered, as the case may be. The arrangement may be varied by causing the first wheel with a rack upon the window sash, so that when turned the window is raised or lowered thereby.

In another arrangement an endless chain is connected with the window, and operated by means of a handle wheel or roller, the teeth of which take into the chain. Handles may in any case be applied outside if desirable.

[Printed *ed.* No Drawings.]

A.D. 1866, May 25.—N° 1458.

COOKE, JOHN.—(*Provisional protection only.*)—"in the rails or permanent way of railways, and in guiding and retaining locomotives and carriages, and obtaining additional safety in travelling."

In this invention the wheels of locomotive engines are without flanges, the rails having an inside flange for guiding such wheels, and guide wheels attached to the under sides of such locomotives and carriages also acting against the inner sides of the rails.

The guiding surfaces may be lubricated by means supplied thereto from a receptacle "attached to the guide." The inventor states that this arrangement and guides affords great additional safety in travelling with great velocity.

[Printed, *ed.* Drawing.]

A.D. 1866, May 25.—N° 1459.

EVANS, JAMES WILLIAM.—"Improvements in the manufacture of coiled springs packed with fibrous materials."

This invention relates to coiled springs packed with other fibrous material such as those for which a patent was granted to Percy Green Gardiner, A.D. 1863, Dec. 31/07, and consists in the first place in the

machinery for forming such springs, and in the second place to the construction of machinery for packing such springs with the fibrous material.

In the first part of the invention a hollow driving shaft is mounted in suitable bearings, and contains within it a mandril rod, at one end of which is a grooved mandril on which the wire is coiled to form the spring, the wire being directed thereto by a grooved roller, placed alongside of and working in unison with the mandril, the two being connected by toothed gearing, and the wire being held down upon the mandril by means of a lever which is actuated by a cam and a lever handle. On the hollow driving shaft is a clutch, and loose on that shaft is also a driving pulley furnished with a corresponding clutch, the clutch on the hollow shaft being moved to and fro by means of a lever in order to cause movement of such hollow shaft and mandril rod at pleasure. The mandril rod is moved to and fro in the hollow shaft by means of another lever, and on that shaft is also a nob or collar furnished with spokes or levers by the use of which a workman may stop the rotation of the mandril shaft at any particular point.

According to the second part of the invention certain cross heads carry a large screw nut which may be caused to revolve in either direction by means of certain driving pulleys and clutches, when driven in one direction this nut giving motion in opposite directions to screwed rods connected with rams, these when propelled away from the nut pressing the fibrous material into springs, one of which is mounted at each end of the machine. Each spring is supported by a holder, which is formed in two parts so hinged or jointed together as to open and close at pleasure, the inner part of each case being furnished with a screw thread which fills the spaces between the coils of the spring during the process of packing, and so prevents the fibrous material from being forced between the coils. Certain disengaging apparatus is so arranged as to stop the rotation of the screw nut when the springs are sufficiently packed, and such nut being then set in motion in the opposite direction withdraws the rams from them. The positions of the holders can be varied by means of screwed rods and nuts, according to the length of the springs to be packed.

[Printed, 2s. 6d. Drawings.]



A.D. 1866, May 2

JOHNSON, JOHN HENRY. — (*A. Kinnear.*) — (*Provisional protection*)

" position for journal boxes or bearings.

This invention relates to a composition for journal boxes or the bearings of

" durability and a better rubbing

composition is formed " by fusing

" with borax and prussiate of iron

" addition of lead, according to

" required."

It is mentioned that for light

following proportions will be found

Copper, 1 lb.; glass, 4 ozs.; borax

$\frac{1}{2}$  oz.; and lead, 8 ozs.

In cases where the journal or its

stand a very heavy weight, or are

jars, the lead may be omitted, or at

leave the composition hard enough

jars, the decrease in the quantity of

by an increase in the proportions of

and glass, the essential feature of the

consisting " in hardening copper

" mixing glass with it in a fused

" ing more perfect fusion and un-

" prussiate of potash in the said composition

[Printed, 4d. No Drawings.]

A.D. 1866, June 2

WHITBY, TIMOTHY. — " Improvements

" and other carriages."

According to this invention " corrugated

" steel, and in constructing a spring

" riage to be used between the frame

" two corrugated plates are used, and

" the frame and to the body of the

" ordinarily so that the ends of the

" fro, so that when the convex part

" more and more into the concave

"tend to flatten the corrugations and extend the length of the springs, whilst the reaction of the springs causes the corrugations of the plates to assume their normal form, and force the convex corrugations of one plate out of the concave corrugations of the other plate. More than two corrugated plates may be thus employed between the body and frame of a railway or other carriage," and in some cases "the plates of the springs may be fixed at or near their ends."

The patentee mentions that in forming buffer springs "each carriage may have only one corrugated plate affixed thereto." in which case he usually affixes the ends of the plates to the frames of the carriages, the requisite play and elasticity being obtained "between the two points of fixture of each plate; or more than one such plate to each carriage may be thus used in constructing buffers between two carriages; and in some cases in constructing buffer springs between the ends of carriages the fixing of the corrugated plates may, as before stated, be at a point or points intermediate of their length," guards or checks being applied when requisite "to prevent the corrugated plates separating laterally."

A light carriage spring is described as being composed of two corrugated plates of steel, with a strip of leather between them, other modifications of the invention being also described.

[Printed, 10d. Drawing.]

A.D. 1866, June 23.—N° 1677.

DUNN, THOMAS.—"Improvements in machinery for turning, shaping, and cutting metal."

One part of this invention consists of an "improved duplex lathe," by means of which the "four journals of two railway axles" may be turned simultaneously, or the tyres of railway wheels when fixed upon their axles.

This lathe consists in the first place of a bed plate, with which are cast, or to which are bolted, four fixed headstocks. The ends of the bed are supported on stands, as usual, but the middle part, which is usually unsupported, is in this case sustained by a headstock contrived for the purpose. The headstocks support two hollow spindles, the first of which is driven directly from the head gear by a strap passing around speed pulleys connected with suitable gearing, certain screws and moveable nuts, with racks

and pinions, and other adjuncts, be part of the invention. Four slide usual turning tools, are employed, "cast double," and connected to a "may easily be lifted out of the" "passed into or drawn out of the" be made with swivel bearings, which requisite. By these arrangements, "need to be removed when the as" "the lathe;" or the loose headstock studs. The four slide rests are in slide plates, and they are traversed taking into nuts connected with the apparatus connected therewith, are in carrying out this part of the invention in some cases moved laterally to and pinions.

A machine for turning the type described in which the bed is provided for the wheels, there being at one stock, and two double slide rests be opposite sides of the wheel or other cams, screws, bowls, levers, and other as aiding in this part of the invention.

The invention is described at some moments suitable for shaping machines apparatus of a similar character.

[Printed, 4s. 6d. Drawings.]

A.D. 1866, June 2

BREWER, EDWARD GRIFFITH.—  
*and Robert Terry.*—(Provisional)  
 "improved coupling for railway"  
 "gous."

One object of this invention is "a"  
 "fore generally existing between"  
 "waggons after being coupled up,"  
 the employment of two links, one so  
 and the two being united by a lever,  
 but not necessarily, a slot, in whi

This lever is provided with an arm, which, after the links are hooked to the drawbars of the carriages, trucks, or waggons to be united, is drawn back or reversed, thus bringing one of the links partly over the other and reducing the distance between the vehicles, the lever being secured in position by a hook which takes upon one of the links, or by a clip or spring fastening, or any other suitable means. The slot in the lever allows of the vehicles "being forced together in sudden backing, for instance, when the buffers might be driven quite home."

[Printed, 4d. No Drawings.]

A.D. 1866, June 26.—N<sup>o</sup> 1699.

HOLLISS, CHARLES PEACHEY.—"Improved modes of applying packing of elastic or flexible materials to axletrees, springs, and bearings of railway and other carriages, to rails, chairs, and sleepers, and to frames of machines, for isolating them from contact, and preventing noise."

This invention consists of "improved modes of applying packing of elastic, flexible, and non-conducting materials, so as to completely surround the parts treated at all points of contact or connexion," thereby isolating them, preventing the transmission of sound, and counteracting the disagreeable results of vibration.

The invention is mentioned as being especially applicable to the axletrees, springs, and bearings of carriages and vehicles, to the rails, chairs, and sleepers of permanent ways, and to the frames of machines. The packing employed is composed of india-rubber vulcanized or unprepared, cork, felt, leather, or cloth, separately or combined, but other materials may be used.

The patentee describes in the first place a "novel clip," which he designates an "union clip." "This clip for the axletree and springs may be welded or made in one piece, with the surface which rests on the axletree extended outwards, so as nearly to abut against the flange of the axletree, and inwards several inches along the axletree, thereby giving a greater bearing surface to receive the packing, and the surface on which the springs rest is to be extended about six inches, with the ends turned down at right angles for the same purpose." The springs have a corresponding plate rivetted to them, "with the ends turned down at right angles over the end of the clip plate," to prevent the springs from shifting from position, room being

allowed for the packing. This clip "entirely" "necessity of screwing up so tightly as at present practice," "ordinary mode of fixing," a certain top plate being "to prevent recoil," this being all that is necessary to clip and springs in position, "while the packing has to exert its elastic force." The axletree and springs at the points of contact, surrounded with the non-elastic material, and so as to completely isolate one from the other, the union clip and top plates being then screwed up so as to compress the springs in such a manner that the latter "cannot" "shift from their position, and no sound can be transmitted" "through them." The heads of bolts, and the different parts of other machines, may be packed in the same manner.

The patentee mentions that in applying his invention to carriages, omnibuses, and similar vehicles, he prefers to use "the under carriage and springs to a frame of iron, or" "both combined," the body being then embedded in the packing and the packing applied as desirable, such packing being inserted between the rims and the tyres of the wheels.

[Printed, 1s. 4d. Drawings.]

A.D. 1866, June 30.—N<sup>o</sup> 1745.

MACNEILL, TELFORD.—(*Provisional protection of* "improvements in the construction of railway rolling stock" "the permanent way applicable thereto.")

The object of this invention is to enable railway travel "upon a mixed or double gauge of rails, that is," "upon a narrow or a wide gauge as required." The feature of the invention consists in placing four wheels on the axle of the vehicles, the two external wheels being of the wide and the two internal wheels for the narrow gauge. The internal wheels are of less diameter than those which run on the wide gauge of rails, so that when the vehicle is travelling upon such gauge the narrow gauge wheels will be clear of points and crossings, inclines and gradients being arranged in the construction of the permanent way so as to compensate for the difference of the different wheels of the vehicles being brought into bearing in changing from one gauge of rails to another, the narrow gauge wheels being of course raised somewhat higher when running

larger wide guage wheels than when running upon the narrow guage and smaller wheels.

[Printed, 4d. No Drawings.]

A.D. 1866, July 2.—N° 1748.

BAKER, WILLIAM JAMES.—“An improved method of and  
“apparatus for facilitating the passage of a guard or other person  
“along the outside of a railway passenger train in motion.”

This invention is meant to be carried out by “fixing to the  
“sides of any van or carriage, or vans or carriages of a railway  
“passenger train, rails or guides made continuous from the  
“guards’ van, or one of several guards’ vans, the whole length of  
“such train, or the van and carriage portion of such train, or  
“continuous from the guard’s van, or one of several guards’  
“vans, to any such carriage or carriages, or any compartment or  
“compartments of any such carriage or carriages, and in case of  
“several guards’ vans being used in such train, to any other or  
“others of such vans it may be considered desirable, expedient,  
“or necessary to bring within the scope of communication, upon,  
“and supported by which rails or guides runs on grooved wheels  
“a vehicle or receptacle,” called by the patentee a “cage,” and  
intended to receive the guard of any such train, or any person  
acting as such; “and in and by means of which cage such guard  
“or person, whilst such train is in motion, can bring himself into  
“communication with any van or carriage, or vans or carriages,  
“or any compartment or compartments of any van or carriage,  
“or vans or carriages, between which and his van such rails or  
“guides are continuously fixed.”

[Printed, 10d. Drawing.]

A.D. 1866, July 5.—N° 1781.

FWLER, ROBERT.—(*A communication from Edwin Parke  
Quadling.*)—“Improvements in locomotive engines and tenders.”

In this invention a “combined locomotive engine and tender”  
is mounted upon a strong frame, this being carried by two bogie  
frames, one of which is below the boiler and the other below the  
tender. Each bogie has two (or more) pairs of wheels, the axles  
of which are by preference coupled, and each bogie frame carries  
a pair of cylinders, with suitable pistons and appendages, from  
which motion is communicated to one pair of wheels. The axle



perform a roll  
joint is concealed  
with the main  
is a hollow s  
the bogie fr  
perform the l  
the concave s  
joints, certain  
to transmit th  
sockets. Each  
and with the  
communicate  
through the  
cylinders, the  
with pipes at  
when the mac

The details  
of the roof o  
motive engine  
" water when  
and also for  
varying diam  
" tubes."

[Printed, 2s.

or truck, the said shoot "having sides and working on a move-  
"able pivot. When tipping, this shoot is lowered on to the buffers,  
"and not only facilitates the tipping, but prevents breakage  
"by doing away with the sudden fall of whatever material is  
"being tipped, and concussion against the buffers and draw gear;  
"it also prevents waste by forming a guide for the delivery."

[Printed, 4d. No Drawings.]

A.D. 1866, July 24.—N<sup>o</sup> 1923.

KOCHS, WILLIAM EDWARD.—(*Provisional protection only*).—  
"Improvements in the construction of railway carriages."

The chief object of this invention is to adapt railway carriages for moving round sharp curves with safety and expedition. Instead of connecting as hitherto the ends of the carriage springs above the axle boxes in a direct way, or by links with the rigid framing under the body of the carriage, the inventor employs a new arrangement of bogie frame, which will allow of the outer pair of wheels, when the carriage is running round a curve, receiving a greater lateral motion than the hinder pair without causing any sudden jerk upon any part of the framing or carriage body. "This is effected by connecting the bogie frame with  
"the rigid framing under the body of the carriage by means of a  
"main central pivot, the exact position of which will depend  
"upon the distance of the wheel axles from each other, but which  
"will be nearer the hind than the fore axle." The springs for the axle boxes of the bogie are independent of the body of the carriage, but they play freely in the bogie frame, and midway of the length of the latter, above the springs on either side, is secured a third or intermediate spring forming a connection between the bogie frame and the framing of the carriage, whereby the shocks to which the bogie frame is subjected are transmitted in a greatly reduced measure to the body of the carriage, whilst the lower or axle-box springs follow the motion of the wheels in curves (remaining always parallel to the same). The upper springs have each a motion round a central pivot, and their ends bear through antifricition rollers the weight of the carriage body, and permit of its receiving a longitudinal motion without any strain being put on the springs, the axles and axle boxes being at liberty to accommodate themselves to any unevenness of the rails. The longitudinal force transmitted by the buffers is taken by the

two strong central beams, placed in the carriage, "whilst the buffers themselves are framed only by means of three rods, so that a sudden blow or shock can produce no injury to the framing. The two buffer rods are connected by a balance beam, having as a fulcrum a rod between the others; if then one rod is forced out, the other will be forced out. The rods being stronger than either of the buffers, the spring only in the moment of impact is broken; thus the damage to the trains; thus the damage to the

[Printed, 4d. No Drawings.]

A.D. 1866, July 3

PHILLIPS-SMITH, JOHN.—"An

"improvement in the gines, parts of which improve motive engines and wheeled cars."

The first part of this invention relates to a locomotive engine or carriage from the front of part of the engine or driving wheels, or descending an incline." The invention prevents from running backward, such an accident by there being a ratchet wheel, and a dog or ratchet pawl, the arrangement being such that the engine or carriage is prevented from revolving, should it attempt the action of the ratchet or dog upon the wheels to back the vehicle, the dog must be reversed, this arrangement serves to prevent the carriage from running away in either direction, being provided, either of which may be attendant. Or in place of these may be mounted on the framing, and a pawl attendant may at any time thrust into the holes or notches formed in a circular series of axles.

The other parts of the invention

[Printed, 1s. Drawings.]

A.D. 1866, August 3.—N° 2006.

DEAKIN, WILLIAM, and JOHNSON, JOHN BAGNALL.—*(Provisional protection not allowed.)*—"Improved means and appliances for the manufacture of tubular and hollow cylindrical bodies, where great strength and lightness is required."

This invention relates to "important improvements" upon the invention for which a patent was granted to James Thompson, A.D. 1864, April 22, No. 1018, and which invention had reference to the manufacture of hollow axles and axle boxes, and other tubular articles. And these improvements consist in producing such articles by preference from the homogeneous metal known as Bessemer's steel, such metal being used in such quantities or parts as may be requisite, and being drilled, punched, pierced, or perforated, and treated by the processes, means, and appliances described in the Specifications of Patents Nos. 1341 and 2795, both of the year 1865, and granted to the present inventors "for the manufacture of gun barrels and ordnance," the metal being thereby reduced to the shape and dimensions required, "whether regular or irregular, together with the formation of flanges, bearings, journals, or projections, so that a tube, cylinder, or hollow cylindrical body or part may be formed and fashioned to any given shape, according to the purpose desired, in one entire seamless piece without weld of any kind." And such body may be subsequently treated and bent into any requisite form by the means set forth under the patent just mentioned, and flanged, indented, or otherwise operated upon by pressure, or a blow or blows; slips, guides, seats, dies, clamps, and other articles being used as requisite.

[Printed, *ad.* No Drawings.]

A.D. 1866, August 16.—N° 2103.

BONNEVILLE, HENRI ADRIEN.—*(A communication from Etienne Pagat.)—(Provisional protection only.)*—"Improvements in the manufacture of the wheels of carriages for conveying coals and other minerals in the working of mines."

This invention consists "in casting together the wheels of carriages for conveying coals and other minerals in the working of mines with their grease boxes so as to form but one piece. The naves of these wheels are covered with a circular plate of metal, simultaneously cast together. The circular surface of the axle-

elasticity of the rubber being sufficiently so to cause it to crack or rubber protecting both the fibres of the rubber from being affected by external influences.

The oblique position of the fibres of the envelope may be produced by different modes of weaving the threads diagonally across a piece of goods. Or the arrangement may be such as to give the material the "finely corrugated condition," the absolutely necessary that they shall

[Printed, &c. Drawing.]

A.D. 1866, August

WAPPENSTEIN, RUDOLPH.—

"An improved carriage for railway use of which turntables are dispensed with."

The object of this invention is to enable carriages to be run from head railways in warehouses, or from vessels can be brought to any place intended without the necessity of the mouth of a mine without end.

This improved carriage is constructed to employ two or more plates of suitable material, an upper and lower plate, and so on in any manner. In the lower plate are a number of holes in which are placed balls of iron or steel. The balls are kept in position when travelling on the plate. To the centre of the carriage is fixed a hollow frame of metal, so as to fill up the space between the rails, a number of balls or wheels which run on the rails, and act as guides, and prevent the carriage from swaying, and also have the effect of diminishing the resistance when the carriage is loaded it is pushed forward by the balls on which the carriage wheels run on the rails and readily adapt themselves to the rails which they may be required to pass over. For overhead railways the hollow

pensed with, and in place thereof a pulley is fixed to the centre of the carriage so that goods can be transferred from a crane, and by means of ropes or chains be attached to the said pulley, and the carriage then traversed along the rails to the part required.

[Printed, 4d. No Drawings.]

A.D. 1866, August 24.—N° 2174.

**FELL, JOHN BARRACLOUGH.**—"Improvements in or applicable "to locomotive engines and carriages, adapted more particularly "for use on railways having steep inclines, but which may be "also used upon railways of ordinary gradients."

This invention consists of improvements upon those for which Letters Patent were granted to the present patentee A.D. 1863, January 26th, No. 227, and December 16th of the same year, No. 3182.

The first part of the invention relates to the use of "gripping wheels," which act upon the sides of a central rail, and consists in dispensing with the use of the toothed wheels usually employed for coupling together the axles of the gripping wheels, or at least removing some of the objections to the use of such wheels, by substituting in place of them frictional gearing alone or a combination of frictional and toothed gearing, viz., wheels in which "the centre part is toothed all round, and the margin "upon each side is frictional; or one side is toothed and "the other side is frictional." A rocking shaft, with slides and connecting rods, may also be used in carrying out this part of the invention, or in place of the rocking shaft levers may be used, various modes of carrying out this part of the invention being set forth.

Another part of the invention has for its object the dispensing with crank pins and coupling rods under the gripping wheel axles, this, along with the object of the first part of the invention, being in some cases accomplished by the employment of two sets of diagonal rods, one pair connecting the front and the other pair the hind gripping wheel axles, the slide blocks of each pair of rods being connected by a rod, so that both sets of diagonal rods, slide blocks, and their connecting rod, "will have synchronous movements, and consequently all the axles will turn together, and "the driver of one crank will be helped over its centres by the "driver of the other crank."



Another part of the invention relates to  
"the rocking shafts for connecting  
"wheels (hitherto placed in front of  
"the cylinders more accessible, and  
"rocking shafts above the level of  
"under or partly under the boiler,  
"rocking shafts being connected to  
"rods, which transmit motion to the  
"gripping wheel axles."

Another part of the invention consists of  
"and combination of parts of the  
"carrying axles are moved backward  
"or behind the fire-box if necessary,  
"cylinders so far overhang the fire-box  
"room to attach the connecting rods  
"cranks upon the front gripping wheels  
"being placed under the framing of  
"the cylinders, the arms from the  
"blocks of the piston rods." The wheels are  
coupled by different means, various parts of  
the invention being described.

Another part of the invention relates to  
"wheels employed to act upon the  
"carriages and waggons along the  
"carrying wheels from getting out of  
invention consisting "in mounting  
"in suspending the frame or the guide  
"the axles of the carrying wheels  
"not to the carriage framing, but  
"them from the action of the carrying  
"more powerful and certain in action  
"carrying wheels to mount or get out of  
mentions that an important advantage of  
the guide wheels can be placed at the ends of  
carrying axles to exercise guiding action  
before the flanges of the carrying wheels  
carrying rails.

The invention further includes  
"carrying axles (the carrying wheels  
"with wheels for guiding," the guide wheels  
the fixed axle, or the parts for carrying

so attached, "thereby simplifying the framing, and dispensing  
" with journals requiring to be lubricated when the parts or  
" framing carrying the wheels have to be suspended from rotating  
" axles."

Another part of the invention consists in mounting the brakes intended to act directly upon the centre rail upon framing or parts suspended from the carrying axles or axle boxes, or upon the same framing as that used for the guiding wheels; the brakes and the modes of actuating them being similar to those described in the Specification of the Patent, No. 3182, A.D. 1863, already mentioned.

Lastly, the invention consists in " combining brakes to act upon  
" the guiding wheels, the brakes and guiding wheel axles being  
" reciprocally connected, so that the pressure put upon one brake  
" to force it against its wheel will react through the axles of the  
" other wheel to force it against the centre rail, each brake in  
" addition forcing its wheel against the centre rail. This is accom-  
" plished by making each axle the abutment or point of resistance  
" for pressing the brake upon the opposite wheel. Or the force  
" used to press the brakes against their wheels is transmitted  
" through a lever having its fulcrum upon the slide of the wheel  
" axle, the lever being so proportioned that a portion of the force  
" transmitted acts to force the axle in the same direction as the  
" brake acting upon the wheel. By this means the pressure  
" acting to give adhesion to the wheels upon the centre rail is  
" greater than that of the brake blocks against each wheel."

[Printed, 1s. 6d. Drawings.]

A.D. 1866, August 25.—N° 2193.

PLIMSOLL, SAMUEL.—"Improvements in the means and apparatus for facilitating and perfecting the unloading of coals and other goods from railway waggons."

One part of this invention consists in the construction of what the patentee terms a "traversing truck," such truck being intended for use in moving other trucks or waggons from one line of rails to another. This traversing truck consists of a strong frame, mounted upon flanged wheels of the ordinary character, and carrying rails which are placed across the frame, the truck or waggon to be moved being run upon such rails, and the latter being each curved upwards at one end to prevent such truck or waggon from

being passed thereon beyond the traversing truck is described, however so curved upwards, this truck being in which it is desirable that the truck should be passed upon the traversing latter, and removed from it at the end of these traversing trucks work are low trucks or waggons to be moved upon thus passed to and from the traversing difficulty.

Trucks for the carriage of coals are as each having the bottom formed in "middle," and in order to discharge or waggons they are brought over lines of greater height than usual. The waggon being hinged together in the part a tendency in the coals or other each side, this, however, being prevented by a hopper, which direct the coals or other lines of rails under the truck. And the flaps of the truck or waggon with the hopper flaps of the truck cannot fall wide, coals or articles previously discharged this preventing them from receiving attendant upon the usual mode of discharging waggons.

The invention includes various railways, inclined shoots with screening bars, and sluices by which the discharge may be regulated; the sluices deliver into receptacles placed on weighing machines weighed. None of these arrangements present series of Abridgments.

[Printed, 10d. Drawing.]

A.D. 1866, August

JOHNSON, JOHN HENRY. — (*Amédée Gellée.*)—"Improvements in" which improvements are applicable to

This invention relates to an arrangement for breaking mechanism, whereby the wheel

may be broken simultaneously, such mechanism being also partly applicable to the coupling of other revolving shafts or spindles.

According to one modification of the invention it is proposed to apply fast and loose pulleys to one of the axles of the tender, and to transmit a rotatory motion from the fast pulley by means of a driving strap or chain and pulley to a special shaft, which is termed, for the sake of distinction, the "break-actuating shaft," such shaft being provided at each end with a bevil wheel, gearing with a corresponding bevil, fast upon a longitudinal spindle carried in bearings on each side of the framing. Each carriage of the train is provided with a similar pair of longitudinal spindles, and the various spindles throughout the train are coupled together by means of sockets and bosses so contrived that they admit of the spindles "rocking or playing in a vertical or lateral direction, " according to the motion of each individual carriage of the " train." The break blocks may be made to operate either upon the rails or upon the wheels of the train, and may be applied either by means of screw spindles or racks and gearing from the longitudinal spindles mentioned above, or by knee-joint levers worked by screw threads and travelling nuts on the same shafts; or they may be attached directly to long levers centered on brackets at each end of the carriage framing, and near to the rail surface, such levers being raised or lowered at their free ends by a travelling nut on a vertical screw spindle, or by a rack and pinion driven from the longitudinal break shaft by gearing, or they may be applied by chains or otherwise. Instead of there being fast and loose pulleys on one of the ordinary axles of the tender for working the breaks, " a special axle and pair of running wheels may be employed, capable of being raised or lowered from or on to the " rails according as the breaks are to be taken off or applied." This axle or shaft may be raised or lowered by a screw spindle and nut, or other mechanical equivalent, and is provided with a driving pulley and strap for working the break mechanism, and a sand box may be adapted to the guide of each break, whereby when the rails are wet or greasy sand, cinders, or some other " frictional " agent," may be applied thereto.

Different modifications of the invention are described, in some cases the movement for actuating the breaks being obtained " from " the circumference of the wheel tyres by the aid of friction " pulleys."

[Printed, 1s. Drawings.]

A.D. 1866, August

CLAIRMONTÉ, ADOLPHE J.  
not allowed.)—"The elastic tubular  
" pannels."

"These pannels are formed "by a  
" with one or more air chambers  
" which may be covered either  
" or woollen or cotton cloth, as may be."

"These pannels are mentioned  
" cushions of and seats to railway  
to the pannels of saddles, the pannels of  
breast plates, and breast bands, and  
placing under saddles for both  
chairs, sofas, and seats of all kinds."

[Printed, 4d. No Drawings.]

A.D. 1866, September

KITCHEN, JOHNSON, KITCHEN,  
SAMUEL.—(Provisional protection)  
" break."

This invention is designed for  
breaks of railway carriages by the  
as for placing them solely under the  
the engineer. The improvements  
steam cylinder, conveniently placed  
the piston rod of which is in direct  
of the carriages through the middle  
which are arranged as follows:—The  
bar or rod, which extends the whole  
ends of these rods being provided with  
capable of adjustment in such manner  
are connected can by means of special  
constructed so as to cause the bars  
is "coupled up," to be in close contact  
thereby one continuous connection  
end of the train. "These bars are  
" to the body of the carriage, and  
" connection with a cross-bar connecting  
" 'blocks.' Thus, when it is desired  
" engineer turns steam into the

" gradually or suddenly applies the break to the wheels through-  
" out the whole train." The lever by which the steam is turned  
on into the break cylinders is so arranged that it can be connected  
with or disconnected from the ordinary handle for turning on  
steam into the locomotive cylinder, the engineer, in case of emer-  
gency, thus being enabled to turn the steam into the break cylin-  
der by the same movement that shuts off the steam from the  
cylinder of the locomotive.

[Printed, 4d. No Drawings.]

A.D. 1866, September 21.—N° 2423.

LAURENT, GILBERT AMABLE.—(*Provisional protection only.*)—

" Improvements in machinery for stopping or retarding railway  
" trains and preventing accidents on railways."

According to this invention " the rotative movement of the  
" running wheels is, when it is desired to stop the train or lessen  
" its speed, replaced by a sliding motion on another set of wheels  
" or segments of wheels, thus avoiding accidents from the train  
" running off the rails through broken axles, declivities in the  
" ground, or other causes." In order to carry out the invention  
the engine and carriages have on each side a flat bar of iron,  
" forming a strong frame, and carrying the same number of  
" supplementary axles as of ordinary axles. These supplementary  
" axles are provided with wheels, or double segments of wheels,  
" placed excentrically, and serve when required to lift the carriages  
" a certain height above the rails.

" These wheels are moved on to the rails by a coupling connect-  
" ing rod which joins them together, and by a transmission rod  
" which is fixed underneath to a regulator screw nut sliding  
" between guides and fixed horizontally to each carriage," certain  
screwed shafts, coupled together by sliding joints, serving to con-  
nect the apparatus of one carriage with that of another, as well as  
that of the engine, suitable gearing and a lever handle or wheel on  
the engine enabling the brakeman to operate upon the whole  
simultaneously, and so lower the supplementary wheels down to  
the rails, when they will rub against the rails, " and by reason of  
" their excentricity slightly raise the carriages and butt against  
" the principal wheels ; neither one nor the other can then turn,  
" and the whole train sliding instead of rolling is forced to stop."  
The screwed shaft of the last carriage is provided with a clutch.



"roads."

This invention consists of wheels, which are in the form of railway wheels, and it is a metallic band or arm, having an arm and blocks being of compressed air or jointed arm blocks are forced in between the band or arm is connected to a quick-throw lever, which a longitudinal rod is passed through a stationary block or a revolving nut, which vehicles for communication may be connected to the driver, and when the spring steel the block is removed the pressure is removed.

In applying the invention made to project between the wheels together by universal joints, the train may be connected by gearing.

The invention is

According to one part of this invention the window of a railway carriage door has connected to the lower part of its frame a spring barrel, on the outer circumference of which are cogs or teeth, the latter being in gear with the cogs or teeth of a rack which is fixed vertically inside the door, the result of the arrangement being that on the spring barrel (the spring within which is wound up or charged before the barrel is placed in position) being allowed to act, it travels up the rack, raising and closing the window. This may again be depressed by hand to any requisite extent, and be maintained in any required position by means of a spring catch, which enters one or other of a number of holes or recesses formed in a strip of metal which is attached to one side of the window frame.

The invention is also set forth in detail as applied to the windows and shutters of houses, and may be applied to other purposes, the invention being in fact an improvement upon that for which a former Patent was granted to the present patentee, A.D. 1864, November 23, No. 2924, this improvement dispensing entirely with sash lines, bands, cords, or chains.

[Printed, 10d. Drawing.]

A.D. 1866, October 4.—No 2551.

DANIELL, JOHN WILLIAM.—“Improvements in the construction and mode of propulsion of locomotive carriages, and in apparatus to be used in connection therewith.”

According to this invention “the use of rails for locomotive carriages is either wholly or in part dispensed with, and many of the disadvantages and evils attendant upon the present mode of constructing and working railways and the rolling stock employed thereon are avoided. The locomotive carriages, and also the carriages used for the conveyance of passengers and goods, are constructed without wheels, their transit being effected by sliding or passing over and upon the peripheries of a series of wheels, sheaves, or pulleys attached to frames placed at suitable distances apart from each other, and extending throughout the entire length of the line of road on each side thereof.”

In order to propel a train thus arranged the locomotive is provided with an endless chain passing round toothed wheels or pulleys to which motion is given by a steam engine or other

suitable apparatus, the endless chains are each jointed to it at one end, the chain causing the other ends to successively into contact with stops at distances asunder in the roadway, two may be used, and may carry rollers act against blocks or uprights pilot bars may be carried by a single chain.

This mode of propulsion may be used "with locomotive engines with ordinary constructed."

Those portions of the framework which pass over the friction wheels, slide on with plates of metal which extend across the carriage, additional plates or flanges on the sides of each carriage, and projections prevent it from running off the wheels or pulleys, "pilot bars" ensuring the guidance of them. These pilot bars project from the carriage, and put in motion the carriage, the weight of the carriage comes upon the wheels, shock being given to the latter by the pilot bars while in a state of rest. In a similar manner "pointers" or guides are mounted and carried thereby, and are made to follow the curves, fixed to the wheel, sheave, or pulley, being turned into such positions as to form any suitable gearing, and at which there are curves, or at which the propulsion is desired; wheels, sheaves, or pulleys may be employed, the largest being "pilot bars" of the curve."

A break arrangement is described in which bars of iron placed below each carriage, such bars being so arranged that they are raised and cranks or screws or other suitable means push them outwards and forced against the stops mentioned above as being fixed to the frames. And where a double chain propulsion the bars forming the break are raised by the upright stops or blocks fixed

The "pointers" mentioned above may be used to direct the propelling rods or levers into their positions against the fixed stops in the roadway.

[Printed, 1s. 10d. Drawings.]

A.D. 1866, October 4.—N° 2561.

NEWTON, WILLIAM, EDWARD.—(*A communication from William Allen.*)—"An improved mode of forming collars on metallic axles and other articles."

Before describing this invention the patentee mentions that in forming projecting collars on axles and other articles the practice has usually been to either make the collar from a separate piece of metal and then slip it upon the axle, securing it by screwing or welding, or to take a bar of the diameter of the intended collar, and by forging reduce the body on each side of the collar to the required size, both of these methods being objectionable.

He then states that one part of the present invention consists in grasping the rod or bar from which the axle or other article is to be produced between two sets of dies or jaws, and so applying power to either one or both sets of such dies or jaws as to upset the metal between them until such metal is spread out to the required diameter. <sup>A</sup>The dies or jaws are placed at "such distance apart when caused to grasp the bar or rod as to leave the requisite mass of metal between the two so as to form the required size of collar when upset."

The invention further consists in giving the required form to the collars in the act of upsetting the metal "by making the inner faces of the two sets of dies or jaws of a form the reverse of the intended form of the collars to be produced, so that in the act of upsetting the metal it shall be forced into the cavities of the dies, and be therein moulded to the form required."

Different modifications of the details of the invention are described, the formation of carriage axles being specially mentioned.

[Printed, 1s. Drawings.]

A.D. 1866, October 10.—N° 2621.

MANBY, WILLIAM.—(*A communication from Baron Von Reesgen Von Floss.*)—(*Provisional protection only.*)—"Improvements in apparatus for preventing injury to persons in railway trains."

This invention relates more particularly to these improvements "it is proposed about from four to five feet in buffers being composed of several the other after the manner of the interior of each joint there is fitted rubber, as well as a helical metal extend the buffer again after it former serve as cushions for the As these buffers, by reason of the number of parts or sliding joints they in order to maintain them in a line to couple the two buffers of one and to suspend the outer end of acted on by a weight or spring curved overhanging brackets fitted supports secured to the buffer pulley in the head of such upright the curved brackets or arms, which to bend or fold up under control carried on the underside of the buffers, and running along a support straight bar or rack may be secured underside of the buffer head, through suitable guides in the frame carried by the framing and so gearing into such racks."

[Printed, *ad.* No Drawings.]

A.D. 1866, October

EADES, WILLIAM, and EADES (for *visional protection only.*) — "Improvements in axles."

This invention consists "in a pair of rollers within the bushes, axle bushes or axles, so as to prevent such rollers from coming together at any one part or getting out of position only, whereby their efficiency is reduced." In order to remedy this, rollers on an annular disc by the rollers midway of the length of each

" this necking in a hollow sunk in the edge of the annular disc.  
" The shaft or axle passes through this disc and the friction  
" rollers, each in their own independent bearing upon the outer  
" periphery of the disc, revolve upon their own axes and also  
" around the common centre formed by the shaft or axle, carrying  
" with them the disc on which they are mounted, by which  
" double revolution a species of sun-and-planet motion is kept  
" up, the friction rollers being kept equidistant from each other  
" and from their common centre, and being thus prevented from  
" dropping together by the housing of their independent axes in  
" the outer edge of the loose annular disc."

[Printed, 4d. No Drawings.]

A.D. 1866, November 2.—N<sup>o</sup> 2843.

**FROST, WILLIAM, LEATHER, JOHN HENRY, and NELSON, JAMES.**—(*Provisional protection only.*)—"An auxiliary smith's fire."

This invention relates to the addition to the ordinary smith's fire of an auxiliary or supplemental fire in order to facilitate the heating of large articles, among which are mentioned railway engine and carriage wheels, which cannot conveniently be heated in such ordinary fire alone. The article to be heated is, in the first place, laid on an ordinary fire, and assuming that a railway wheel is to be heated the fire should be of a circular form, such as is generally used for wrought-iron wheels, and above such wheel or other article is applied the auxiliary fire, this being effected by the use of a box or case of wrought or cast iron or other suitable material, lined with fire-brick, and with passages for the admission of the blast, which is conveyed thereto from the flue by means of suitable pipes, although this auxiliary fire may be used, if preferred, without blast. This box or case is capable of being raised and lowered by means of a chain connected therewith passing over pulleys and having a counterweight attached thereto, and is provided with a lid or moveable cover for convenience in supplying the fire with fuel after the case is lowered down upon the article placed in the ordinary fire.

The inventors state that by these means "two washers may be put upon a railway wheel at one operation."

[Printed, 4d. No Drawings.]



A.D. 1866, November 6.—No 2

NAPIER, ROBERT DAVID. — (*Provisional*  
 "Improvements in friction breaks and app  
 "motion to machinery.

This invention consists in improvements in  
 a Patent was granted in the month of August  
 3060). to John D. Napier; "also in various wa  
 "same, and in other plans of friction brakes."

In the first part of the present invention  
 brake strap or its equivalent, surrounding or  
 a wheel, are jointed to a lever in a similar man  
 brake first mentioned, the two joints being  
 the fulcrum of the lever, but the fulcrum of  
 being fixed, is connected to some mechanical  
 it may be moved through an arc of a circle  
 would be that of the brake wheel. In applying  
 as a "pall brake," that is, as a self-holding br  
 slackened when desired, a stop is introduced by  
 of the lever may have its movement limited in  
 attempt at further movement releasing the brake

These arrangements are set forth as being a  
 for brake purposes but also for communicating  
 motion to machinery, and are described with r  
 ing "an improved purchase applicable to wind  
 "hoisting machines;" also to the screwing d  
 or the turning of drilling braces, and as a cli  
 which has to be thrown suddenly in and out of

Another part of the invention consists in othe  
 brakes suitable for cases where it is inconveni  
 surrounding the brake wheel, "such, for exampl  
 "ing brakes to railway carriage wheels." In t  
 a segment of a ring takes the place of the br  
 ends of this segment being jointed to links, w  
 jointed to a lever at different distances from the  
 being on different sides of the fulcrum of the le  
 "nearly straight, is placed nearly at right angle  
 "the centre of the brake wheel to the fulcrum  
 "nearly in a line with such radius as in other

[Printed, 4d. No Drawings.]

A.D. 1866, November 7.—N° 2898.

HASELTINE, GEORGE.—(*A communication from Aaron Higley, Joseph Benjamin Birdsell, and Varium Ogilva Birdsell.*)—"An improved brake for railway carriages."

In this invention there is placed upon the axle of a railway carriage a friction clutch coupling, consisting of a "shell," and a cone which may be thrust into such shell, the latter being fast upon the axle but the cone being loose, and having attached to it a pulley to which one end of a chain is connected, this chain thence proceeding to a swivel and other apparatus connected with a spiral spring. Upon placing the two parts of the friction clutch into contact the cone and pulley attached thereto are made to rotate, and the chain connected to the latter contracts the spiral spring, the result being that the rotation of the friction apparatus, and with it that of the carriage axle and wheels is ultimately stopped. Attached to the shell of the friction apparatus is a ratchet wheel, and close to this, but loose upon the axle, is a pulley carrying a dog or pawl which is in gear with the ratchet wheel, a chain attached to this pulley also proceeding to the apparatus connected to the spiral spring, upon the contraction of which it would be slackened but for the action of a second spring and another chain passing round a third pulley placed along side that last mentioned, which causes the second chain to be coiled upon the latter, the result of the whole arrangement being that after the stoppage of the rotation of the carriage axle, as mentioned above, the tension of the spiral spring re-acting upon the friction apparatus through the medium of the second chain, pulley, dog, and ratchet wheel, causes the spring to aid in again starting the carriage when the two parts of the friction apparatus are disengaged, the cone being moved towards the shell by means of a bent lever and a rope or chain passing to a windlass, and disengaged therefrom by a spring.

Similar apparatus is applied to each axle of the carriage, one or other being used according to the direction in which the carriage is travelling.

[Printed, 8d. Drawing.]

A.D. 1866, November 8.—N° 2912.

COOKE, JAMES SAMUEL.—(*A communication from Joseph Green Cooke.*)—"Improvements in axle boxes."

This invention relates, firstly, to a mode of fitting a stuffing box round the axle adjoining the journal. A shoulder is fitted a metal ring, formed in the axle box to receive it, and the neck or shoulder of the journal or other suitable material, which is pressed from the box at that part, certain the ring against the packing.

Secondly, to so combining the weight of the wagon or carriage with a spring to the axle without putting the journal and brass are kept the axle box is cast open at the top, so that it may be dropped into it, there being no need of packing of india-rubber or other material, a metal plate resting upon this plate the wagon or carriage being borne by the axle. This arrangement equalizing the pressure on the face of the brass, the packing, and the weight of the vehicle from causing the end or shoulder of the axle has a shoulder in the box, in order "to keep the axle from sag of the stuffing box," and the bottom furnished with a plug, through which it is desired to draw the oil from the box.

Another part of the invention relates to brasses for journals hollow, such as oil reservoirs, "one or more apertures in the brass to allow the oil to escape."

[Printed, 10d. Drawing.]

A.D. 1866, November

JOHNSON, JOHN HENRY.—(A.D. 1866, November 12, *Thiercelin*.)—"Improvements in the construction of axle boxes."

The essential feature of this invention is a socket combined with a locking device, which is provided with a curved notched surface, so that it may remain fixed when coupled, or it may be turned all round it if intended to be dis-

“ when coupled. The interior of the socket piece corresponds to the shape of the stem, and through one side of it there is passed transversely the locking and releasing pin, which in all cases is of a circular section. This pin has a notch made on one side of it, of a corresponding section to the stem to be coupled, the radius of the pin being the same as the radius of the curved notch or curved annular groove in the stem. In coupling or fastening the two parts together the locking pin in the socket is first turned so as to cause its notch to coincide with the interior of such socket; a free ingress is thus afforded to the stem, which is now inserted, and when home it is secured in the socket by simply turning the locking pin, so as to bring its solid portion into the transverse notch or annular groove in the stem. To release or uncouple the parts the locking pin is turned back again, so as to bring its notch opposite the stem, when the latter will be free to be withdrawn from the socket.”

This invention is applicable to the coupling together of railway waggons or carriages, to the pole chains and splinter bars of vehicles for common roads, carriage and other lamp connections, securing together the parts of certain tools, and as a “ snap ” for jewellery, purses, and other articles.

[Printed, 8d. Drawing.]

A.D. 1866, November 14.—N° 2984.

CLARK, JOHN.—(*Provisional protection only.*)—“ Improvements in railway breaks.”

“ The improvements which constitute this invention relate in part to the ordinary breaks, and in part to the means of applying the same.”

The objects of the invention are, first, to obtain the break power from the axles or wheels of the train when in motion; secondly, to regulate the power so obtained as required; thirdly, to introduce between the force applied and the break blocks self-adjusting media for compensating for the wear of the blocks upon the wheels; fourthly, to compensate for or prevent the jar of the carriages to which the breaks are fitted; and, lastly, to improve certain parts of the mechanism by which the ordinary breaks are applied.

To obtain the break power from the axles or wheels an eccentric light wheel is suspended at the bottom of a double link, connected

to the under frame of the carriage weighted as to maintain its normal position of use, when its periphery nearly horizontal, or wheel, being turned by contact with the rack, imparting a backward and forward motion. The rack is fitted with a rising and falling pawl at one end, the end of the connecting rod of the engine driver, pushing or pulling back power is imparted to the rod, and is raised and lowered by a cam which may be a rack and pinion, or cord, passing along the train engine driver. This cam is so constructed that when the rack (or a notched bar equivalent) falls into its normal position, the strut which holds the eccentric wheel is raised. In order to regulate the power transmitted to the rack, the position of the rack is adjusted, and the backward or forward motion of the rack and connecting rod is maintained. The rack rises and falls in a fixed frame, when the rack falls into its normal position.

For effecting the third improvement instead of being fixed to the transverse bar, the lever may be pivoted to turn thereon, there being on the transverse bar a segmental rack, and the lever carrying a pawl, so that the lever when moved in one direction will rotate the quadrant or segment and the break elongated eye being permanently attached thereto, over one of the teeth of the rack, so that the blocks are worn to a certain extent, an adjustment being thus obtained. The wear which arises from the ordinary strong spring coupling is introduced by the break connecting rod and the spring may be regulated by suitable adjustment. The spring may also be hung from centres of the wheels, so that the drag of the spring is transferred from a vertical to a horizontal direction. The blocks are used they are bedded in a block of cork, or other elastic or semi-elastic material, and a chain is passed and coupled to the wheels of the carriages for compensating for the wear.

and instead of the "pull" putting on the breaks it may be arranged to keep them out of action, in which case, in the event of a part of the train breaking away, "the breaks thus freed would "be self-applied." The lever and quadrant mentioned above in connection with the rocking shaft may be applied in connection with ordinary breaks, provision being made at the end of the rack of the connecting rod for the power being applied thereto by the ordinary screw and gearing. And the inventor proposes as another improvement to fit double blocks, one above and one below the centre of the wheels, such blocks being brought into contact therewith by a right and left-hand screw worked by suitable levers.

[Printed, 4d. No Drawings.]

A.D. 1866, November 17.—N° 3024.

GRUSON, JACQUES HERMANN AUGUSTE.—"Improvements in "railway wheels and tyres, and in casting the same and other "articles requiring a hard surface combined with strength and "toughness."

The object of this invention is to cast railway wheels and tyres for wheels and other articles "in such a manner that unequal "expansion or contraction during the cooling process shall be "as much as possible prevented, so that the article when produced shall be much stronger and more durable than similar "articles cast in the ordinary way."

In carrying out the invention a mould is employed which is composed partly of iron and partly of sand, the mould being so constructed that the thinner parts of the wheel, tyre, or other article being in contact with the sand (which is not so good a conductor of heat as iron) will not cool down too rapidly, and by this means the cooling of the tyre or periphery of the wheel, which is the thickest part, may be properly regulated. And in order to effect this with certainty and facility a vacant space is provided behind, and in some cases underneath the iron ring of that part of the mould which forms the rim or tyre of the wheel. When the metal has been poured into the mould to form the casting, red-hot metal is afterwards run into the vacant space above referred to, and this metal will check the cooling process and cause the casting to cool more gradually, and with the required uniformity. This metal will, however, form no part of the casting, and when



detached therefrom may be melted again and used for any purpose in another mould.

In making new rims or tyres to be adapted to old wheels of which the tyres of which have been worn out, such rims may be cast solid, but in two thicknesses, each being in the form of a "concentric rings with a space between them," and connected at one side, however, and the whole of the rim, in fact, a rim or tyre having in one side of it a vertical flange of a zig-zag or other suitable form, placed longitudinally and transversely instead thereof, made in the inner ring for the reception of bolts, the whole may be fastened to the rim of the old wheel left in the zig-zag or other flanges for the reception of such bolts.

[Printed, 10d. Drawing.]

A.D. 1866, November 19.—N<sup>o</sup> 3026

MORTON, ELLIS WESLEY.—(*A communication from Johnson Morton.*)—"Improvements in wheels for vehicles."

This invention consists in "the application of an elastic or yielding material between two wheels, or on the rim or tread of a wheel for the purpose of absorbing shock and noise as well as the wear and tear of the wheels impinging of the wheels against the roadway on which they travel, and also in the mode of applying and fastening the said elastic or yielding material."

The patentee states that the most advantageous mode of making the application will vary somewhat with the form or character of the wheels employed, and that when the invention is to be applied to an ordinary wooden wheel the elastic is constructed in the usual manner with the tyre complete, the tyre lighter than usual, "as its use is only to protect the rim," and hold all the parts of the rim of the wheel firmly together. When the invention is applied to a wheel formed entirely of elastic, as, for instance, a railway carriage wheel, the elastic tyre is placed upon the surface of the rim of the wheel, and another tyre then placed around such band, the latter being fastened by flanges upon the rim of the wheel, or any other suitable

In order to protect the elastic band from injury while an outer tyre is being placed thereon in a heated state, the band is covered with cement, or with a thin hoop of metal.

[Printed, *ed.* Drawing.]

A.D. 1866, November 23.—N<sup>o</sup> 3077.

KITCHEN, JOHNSON, KITCHEN, WILLIAM, and SAMUELS, SAMUEL. — “An improved railway break, a portion of the apparatus of which can also be employed as a means of communication between the guard and driver of a railway train.”

According to this invention the breaks of a railway train are mounted in the usual manner, being supported by brackets connected to the framing of the carriage, and connected to diagonal rods proceeding from levers mounted on cross shafts, by slightly turning which the break blocks are pressed against the wheels. In order to so actuate the cross shafts, however, there is upon each another lever projecting upwards, and having at its upper end a slot into which a pin or stud enters which projects from a nut placed upon a screw thread formed upon a longitudinal shaft capable of turning in bearings below the body of the carriage, the result being that when the shaft is turned in one direction the breaks are pressed against the wheels, and when turned in the other direction they are released therefrom. The longitudinal shaft of one carriage is connected with that of another by means of sliding bars and universal joints, and the whole of the shafts of a train are turned simultaneously when requisite by means of gearing mounted below the tender, and a rack connected to the piston rod of a piston placed in a cylinder also carried by the tender, and to which steam may be admitted from the boiler of the engine, steam being made to act upon one side of the piston to apply the breaks and on the other side thereof to release them. This cylinder is provided with a slide valve for the admission of steam to either end of the cylinder, as may be requisite, and this valve is moved by a suitable lever, there being, moreover, a projecting finger on the end of the piston rod, which, when the breaks are being taken out of action, comes into contact with the lever, and by closing the valve prevents the piston from travelling farther than is necessary. At each end of the cylinder, moreover, there is an opening provided with a spring valve, and leading into an exhaust chamber, the result of this being that whatever the

pressure of steam in the boiler and piston will not exceed a certain amount, the pressure upon the valves less. These arrangements may be varied. The cylinder and piston a rotary cylinder upon the break shafts or through a wheel; or such shafts may be connected by a "pendulum."

In order to couple and uncouple the carriages a peculiarly constructed lever which is caused to protrude through the end being of the same diameter as the wheel, and of being turned at right angles to the wheel from falling out until withdrawn by means of a spring pressing upon the pin head.

The invention also includes an arrangement of a train may put in motion the cross shaft carrying cams, which by the friction bowls into contact with the wheels of the guard's van, these bowls then act upon certain shafts and gearing which may be modified by the use of friction bowls, and employing a hand turned by hand, and, by means of a rod, to the break shafts. These are applicable in case the hinder shafts are in the front part of the train. And in the case of a lever which is employed for turning the train, an apparatus consisting of a hammer which by the partial movement of the break shafts may communicate with each other and the breaks.

A mode of applying breaks is a lever of large diameter and a piston, the rod of which is slotted and a lever mounted on the cross shaft, applying more especially to goods waggon or carriages.

[Printed, 1s. 4d. Drawings.]

A.D. 1866, November 23.—N<sup>o</sup> 3080.

SMITH, WILLIAM WASTENEYS.—(*Provisional protection only.*)  
—“An improved method of fixing or securing the tires of railway  
“wheels.”

The inventor proposes, in the first place, “to turn the periphery of the wheel slightly conical, the smaller diameter being at the inner or flange side, the difference in the diameters at the inner and outer edges being as much as the expansion of a tire at blood-red heat will admit, say, about one-eighth of an inch to every foot of diameter, so that when the tire is heated as above its smallest inner circumference will pass over the largest outer circumference of the wheel. An annular recess is turned at the outer side or edge of the wheel, which is to receive a corresponding flange formed on the inside of the tire; the bottom of this recess is also turned conical in the same direction as the outer periphery, and to the same extent,” the side of this recess being also inclined inwards, so as to form a dovetail and act as a wedge to secure the tire if it should by any means (when in use) expand more than the wheel. The interior of the tire is bored out to fit the exterior of the wheel, allowing the usual amount for contraction, the flange in the interior forming a security against the inward pressure of the running flange, and the conical form of the wheel preventing the tire from being forced outwards. The tire is to be heated and then shrunk upon the wheel, the arrangements mentioned above rendering any fastenings to the tire unnecessary. Instead of turning the wheel of conical form it may be made cylindrical, and have a second annular recess on the inner side or edge thereof, in addition to the outer one named above, the edge of this second recess being slightly inclined inwards, “so as to act as a dovetail;” and the details may be otherwise modified without departing from the characteristic features of the invention.

[Printed, *ad.* No Drawings.]

A.D. 1866, November 27.—N<sup>o</sup> 3123.

NEWTON, ALFRED VINCENT.—(*A communication from John Blake Tarr.*)—Improved machinery for making cast-steel railway  
“wheels and other castings in metal.”

This invention consists of improvements upon the invention for which a patent was granted to the present patentee on behalf of

the present communicant A.D. 1866 relates to the formation of railway cast steel. That invention consists in the application of pressure when in the mould, such as by means of screws and gearing, and is mainly in providing means of applying that pressure for that purpose. A cylinder is mounted in the mould, through the lower end of which, when working in stuffing boxes, these pistons are connected to the upper ends to a piston within the cylinder, and to the upper section of the mould, so that water from a force pump proceed to operate on the upper and lower ends of the cylinder, means of depressing the upper section of the mould, and of raising it therefrom, the water from the first place above and in the second place below.

Another part of the invention is in the means of lowering the core, this being effected by means of a cylinder and piston, placed below the core, and actuated in a similar manner.

The invention further includes the means of adjusting and adapting it for castings of different sizes, by dilating the amount of steel required, and of certain hooked screws by which the pressure of the mould may be adjusted.

The object of having three rods, and of the cylinder first mentioned and the upper piston, is to prevent any tilting or "sagging" of the core and its appendages when the metal is being poured, and arranged equidistantly around the core, and respectively.

[Printed, 10d. Drawing.]

A.D. 1866, November

BROOKES, WILLIAM.—(*A communication from William Brook*  
*Helson.*)—"Improvements in the  
"of railway wheels called 'disc wheels'  
"mass of iron or steel."

The patentee mentions in the specification that he usually constructed the disc, or wheel,

nave or boss and the rim of the wheel is "rolled flat, so as to connect the said nave of the wheel to the rim by a flat metal surface or disc," and he then proceeds to state that this invention consists in forming circular indentations, or rises and depressions, in the discs of such wheels, "in order to prevent the tyres from laminating or becoming elongated, as is often the case under heavy loads, thus rendering this description of wheel more generally applicable to railway trucks, locomotive engines, tenders, and other vehicles;" giving such wheels, moreover, more rigidity or stiffness in the disc transversely, and enabling them to be used on railway curves of small diameter.

The invention is carried into effect by employing to produce from a mass of iron in the first place a rough plate or blank a heavy hammer and anvil block, both furnished with dies adapted to produce undulations therein suitable for being operated upon by the rolls of a circular rolling mill, such rolls being grooved or fluted and completing the formation of such undulations while giving the finished form to the rest of the wheel.

[Printed, 1s. 2d. Drawings.]

A.D. 1866, December 1.—N° 3164.

BUTLER, WALTER and DALGETY, ALEXANDER.—"Improvements in the connections between railway engines and carriages."

The object of this invention is to provide a connection for locomotive engines and carriages which will admit of trains passing around the sharpest curves in the lines of rails, but which will become detached "when any undue deviation takes place, as for instance, on the locomotive or carriages running off the line," that part of the train which may leave the line becoming thus separated from the rest.

According to one arrangement a hook is attached to a thick disc or cylinder of metal, disposed with the axis in a vertical position, and between two short cylinders of the same diameter affixed to the end of the draw bar, the disc piece having in it two shallow circular recesses, one on either side, and bolts projecting from the short cylinders passing into these recesses, one above and one below. These bolts are constantly pressed towards the recessed disc by springs contained in the cylinders, and so long as the bolts are not pushed backwards the hook will be



A.D. 1866, December 11.—N<sup>o</sup> 3256

BROOMAN, CLINTON EDGUMBE.—(*A commoner Samuel Maynard.*)—"Improvements in railway  
"waggons."

This invention consists in so constructing the truck carriage or waggon "that should it accidentally  
"either side so that the ordinary wheels leave the  
"supported and be able to run without injury," at  
time warning is given to the engineer, and the brakes  
are applied automatically.

The framework of the truck and the wheels on which it ordinarily travels are of the usual character of each of the ordinary wheels, and upon the same is another wheel of slightly less diameter than the ordinary, the tread of the inner wheels being "as far within the main wheels as the rails are apart at their ends." "switch changes from one rail to the other." On the ordinary axles, about midway of the length of the truck, is another axle, having at each end a small wheel on the lower lines thereof are on a plane with the lower inner wheels on the other axles, but horizontally to the outside of the ordinary wheels as the inner wheels are to them. Thus in case the ordinary wheels are thrown off the line in either direction laterally, the result is that the truck is thrown upon two of the inner wheels on one side, and the outside smaller wheels on the other side, so that the truck is still able to keep the line, but as soon as this occurs the axle, now being brought into rotation, winds upon a spring connected to the apparatus by which the brakes are applied in action, and also a cord connected with the whistle, "thus causing the stoppage of the train and giving  
"the engineer."

[Printed, 6d. Drawing.]

A.D. 1866, December 11.—N<sup>o</sup> 3261

COOPER, THOMAS HENRY. — "Improvements in  
"buffers."

This invention relates to an arrangement of apparatus by which the buffers of a railway carriage will not only be

occasion of a collision, but also be released automatically, and allowed to return without rebound to their original positions.

The buffer rods are mounted in the usual manner, and provided with buffer heads of the ordinary character, the inner parts of the buffer rods being furnished with blocks which bear against the buffer springs, which extend across the framing, and are connected in the middle to the draw bar. On each buffer rod a number of ratchet teeth are formed, and in the event of the rods being driven inwards to an unusual extent these teeth are laid hold of by catches or pawls mounted on studs in the framing, and pressed towards the buffer rods by springs. The buffers are thus locked, and prevented from injuriously rebounding, but on the draw bar coming into action in again moving forward certain chains connected with that bar and also with the catches or pawls, release the latter from the ratchet teeth on the buffer rods and so set the latter again free, but in order to prevent them from now returning suddenly to their first positions they are furnished at their inner ends with pistons or plungers working in cylinders which are each open at the front end and closed at the back with a flap or other valve which is pierced with small holes, the result being that when the buffer rods and plungers are driven inwards the air is suddenly expelled from the cylinders by the opening of the valves, but being only re-admitted very slowly through the holes in the valves on the liberation of the buffers the latter can only return very slowly to their first positions, owing to the resistance of the air in front of the plungers. Cushions of vulcanized india-rubber are placed for the blocks on the buffer rods to strike against when driven in to the extent of their range, and locking pins are provided by which the pawls may be held out of action when the carriage is being moved about by hand.

[Printed, 10d. Drawing.]

A.D. 1866, December 13.—N° 3271.

MURPHY, JAMES.—(*Provisional protection only.*)—"Improve-  
ments in the construction of vehicles to be used on railways."

The inventor in this case proposes to construct a railway wagon or carriage "in such wise that it may at small cost be reduced  
" from a larger to a smaller size; in other words, that being built  
" to serve on a broad guage, it may, by the removal of certain  
" portions and alteration of position of other parts be easily

" adapted for service on the narrow gauge." In this the inventor makes "four sills or side pieces" "securing their ends firmly into the headstocks" "in conjunction with the headstocks form a wide" inventor proposing to "tie them to the inner sills by" "pieces between the outer and inner sills." The inventor states that when the waggon is to be reduced removes the outer sills and portions of the headstocks which are above termed inner sills now forming the narrow gauge waggon. "The sides, front, and" "waggon will be arranged in such wise that the" "headstocks may be removed at the same time" "are shortened, and the side doors or rails may" "uprights made for their reception. In carriages" "will produce the same result. The axle boxes" "serve again (the latter being shortened), or may" "ones be adapted if preferred. All side material" "may be placed on the inner sills when taken in" "No alteration in length of vehicle is contemplated"

[Printed, 4d. No Drawings.]

A.D. 1866, December 19.—N<sup>o</sup> 3331

GOODFELLOW, JACOB.—(*Provisional protection*)  
 "improved apparatus for moulding the moulds of"  
 "and circular and segmental works in green"  
 "patterns."

This invention relates, firstly, to the moulding and consists in forming in each half box a conical hole, serving as bearings for the post or frame which ordinarily strickle used for strickling in green sand the rims and outer surfaces of the wheels or other arrangement enables the post to find its centre bearing without loss of time; and when the moulds and the half boxes are to be put together there is in the hole of the lower half box a conical plug at the bottom, a rod carrying at the top a loose cone, a spiral spring between the cones, so that when the hole of the upper is placed on the upper cone the two parts of the mould are firmly held, central with each other, and the corner holders at the corners of the boxes are dispensed with.

Secondly, the invention relates to an "improved universal core box for making green sand cores for parts of toothed wheels, pulleys, and circular and segmental castings of various sizes, without requiring the ordinary core boxes for each article." A circular or segmental plate of wood or metal is placed in a horizontal position, having a true surface for forming the bottom of the core box, a number of holes being bored in this plate, in either of which is placed a stud carrying a centre block, having flanges near the top and bottom in which there are circular slots to which are jointed the sides of the core box, the slots being for the purpose of regulating the positions of the sides according to the required thickness of the arms. On the bottom plate, and against the sides, are placed pieces or strickles of wood or metal "corresponding in shape with the required flanges, mouldings, and boss of the wheel or article" to be produced, and at the top of the centre block there is a central pin on which is placed an ordinary strickle for strickling the outer curve of the core. The holes in the horizontal plate serve to adapt the core box for different diameters of wheels and other articles, the moveable sides enabling them to be placed and held at any angle according to the number of arms in the wheel or angle of the required core, and as the cores for the wheels and other articles are made of green sand, and the ordinary core boxes dispensed with, "there is great economy of labour and material."

[Printed, 4d. No Drawings.]

A.D. 1866, December 20.—N° 3360.

LAKE, WILLIAM ROBERT.—(*A communication from George Dennis Spooner, John Frederic Fish Hale, and Anrel Clement Stiles.*)—"An improved coupling for railway carriages."

This invention relates "to a universal self-locking coupling device whereby carriages of different heights may be readily and securely connected. A central horizontal partition is formed in each of the drum heads of a car coupling, which partition allows the link or shackle bar to be readily adjusted for carriages of different heights; a universal self-locking car coupling is thus obtained. A stop is provided in combination with the said central partition, and with the coupling pins, whereby the coupling pins in one drum head can be readily adjusted in the proper position to correspond to the position of

" the shackle bar in the other draw head, or to the  
 " may exist in the height of the cars. The  
 " heads are narrowed towards their rear or inner  
 " shackle bar straight, and in the proper position  
 " draw head of the approaching carriage."

The stop mentioned above is a "double" stop,  
 fact a double catch, or a catch with two steps, the  
 being made to rest upon one or the other as may be  
 patentee states that the coupling thus obtained is  
 in its operation, as well as self-locking. "so  
 " operating the coupling runs no risk of being  
 " the draw heads or carriages."

[Printed, &c. Drawing.]

A.D. 1866, December 28.—N° 3414

GÖRANSSON, ERNST FREDRIK.—"Improvements  
 " rings suitable for making tyres of railway wheels  
 " purposes."

Before describing this invention the patentee  
 when rings of steel are cast with a sand core the  
 burnt on to the surface of the metal, and is the  
 difficulty in the subsequent operations of the  
 sand core and runner being also liable to have  
 detached from them, which become embedded in the  
 " cores also as heretofore arranged are very difficult  
 " as the cast ring contracts upon them, and if  
 " withdrawn exactly at the right moment the  
 " becomes useless."

He then states that according to this invention  
 ployed which is made in two parts, each of which  
 of a truncated cone or some similar figure, the  
 cated ends of the two parts of the core butting  
 centre of the ring, whilst their bases or larger ends

The invention may be variously modified. In  
 ring moulds stand upon base blocks of cast iron  
 between them a central upright mould which serves  
 metal for the supply of the ring moulds, and an  
 ingot suitable for being made into an axle or other  
 sages formed in fire-brick leading from the lower  
 upright mould to the ring moulds, the outer cases

composed of cast-iron circular vessels, tapering somewhat upwards, and having an inner projecting flange at the upper end, the covers of the moulds each having cast with it one-half of the double taper core, and being perforated at their highest parts to allow of the escape of air from the mould, the other halves of the double taper cores resting upon the base plates. As the metal cools after being run into the ring moulds, and contracts in the cores, the two parts of which each of the latter are composed slightly separate, the upper parts rising for a short distance.

Other modifications of the invention are described, in one of which the lower half of the core is cast with the base plate, whilst the cover of the mould consists of the other part of the core; whilst in another case the lower part of the core is able to descend as well as the upper part to rise, the lower part being sustained by a lever and a counterbalance weight. Tyres may thus be cast in either a vertical or a horizontal position.

[Printed, 8d. Drawing.]

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## APPENDIX.

A.D. 1795, July 20.—N<sup>o</sup> 2057.

EDGEELL, JAMES.—“Axles on an entire new  
 “ wheel carriages carrying heavy loads, with wheels  
 “ called friction wheels applied to such axles in  
 “ hitherto used or applied to wheel carriages, by  
 “ the friction on the axles of the wheels will be great  
 “ and the carriages drawn with much less power  
 “ construction before used, which invention is very  
 “ any other before found out for reducing the friction  
 “ axles of wheel carriages.”

In this invention the axles are of iron, or steel  
 and strength, each axle having a wheel fixed upon  
 thereof, such axle and the wheels revolving together  
 gradually diminishes in diameter from the centre  
 ends, being round in section, and is furnished at  
 small end with a hole for a key or pin, or a screw for  
 of a nut, in order to keep the wheels in their places,  
 “ them from spreading.” The arms of the axle  
 pieces of wood which support the body or bed of  
 and are kept in their places there by means of stops  
 fixed in the woodwork near the small ends of the  
 key, pin, or nut mentioned above, and also by means  
 called friction wheels which are applied to the axles,  
 wheels being of as large size as can conveniently  
 working upon the axles near to the insides of the wheels  
 the patentee stating that by these arrangements  
 “ will, on level or nearly level roads, or on railways, be  
 “ conveyed from place to place with very little power

[Printed, 4d. No Drawings. See Rolls Chapel Report. 6th

A.D. 1809, November 6.—N<sup>o</sup> 3273.

RANDOLPH, DAVID MEADE.—“ Certain improved  
 “ construction of wheel carriages of every description  
 “ This invention is described at considerable length

mainly to carriages for common roads. One part of the invention consists in causing the front portion of a vehicle to be somewhat lower than the back, a line drawn from the front to the hinder part forming an angle of three degrees with the horizon, and this arrangement is set forth as applied to a train of "iron railway waggons," the front waggon of the train having front wheels of only six inches diameter, while the hinder wheels are so much larger as to give to the bottom of the waggon the inclination desired, the front wheels of the second carriage being larger than the hind wheels of the first, and the hinder wheels of the second carriage, again, being larger than those in front, this arrangement being continued throughout all the waggons of the train, and the result being that a line drawn along the bottoms of the waggons, from the first to the last, will form an angle of three degrees with the line of rails upon which the waggons travel. The precise object of this arrangement is not mentioned. The diameter of the axles increases with the diameter of the wheels on which they work, the axle in each case being one-eighth of the diameter of the wheel, and the bearing of each axle, as well as the tread of each wheel, being equal to the diameter of the axle. An improvement in carriage wheels of all kinds is mentioned as consisting in each wheel having an unequal number of spokes, and a mode of constructing such wheels is described in which a nave of cast iron has wooden spokes secured into it by wedges, several modes of putting together the felloes and other parts of a wheel being also set forth. The details of the invention will, however, only be understood with the aid of the drawings annexed to the Specification. An axle is also described which may be composed of wood, or iron, or other metal, the bearing of the wheel within the box being hollow, if the axle be of metal, and a screw with a "proper head" being inserted into the end of the axle for the purpose of confining the wheel thereon.

[Printed, 1s. 2d. Drawings.]

A.D. 1812, December 30.—N<sup>o</sup> 3632.

CHAPMAN, WILLIAM, and CHAPMAN, EDWARD WALTON.  
—"A method or methods of facilitating the means and reducing  
"the expence of carriage on railways and other roads."

This invention relates in the first place to the employment of a chain or other flexible and continuous substance, fixed at each end, and stretched along the line of rail or road, the locomotive

engines intended to travel upon a track provided with a grooved barrel or wheel upon which the chain or other flexible member is placed, being that upon such barrel or wheel, which is effected by the application thereto, the engine is caused to travel in accordance with the direction in which it is turned, drawing after it any carriage or engine thereto. This part of the invention is shown and under various modifications.

Another part of the invention relates to the construction of the carriages or frames and the arrangement of the wheels. One modification of this part of the invention is that the engine is mounted upon six wheels, which are placed upon an axle which is of the ordinary character in the usual arrangement, however, are mounted upon a separate frame, united to the ordinary arrangement being such that the weight of the engine, that two-thirds of its weight lie on the hind wheels, at which point the weight being disposed over the ordinary framing which is supported therein by rollers resting on the rails, the result of the whole arrangement is that the engine readily adapt themselves to curves of the engine should require eight wheels, having four wheels each, are contributed equally on both. These are adapted for railway purposes, and are also adapted for use on other roads being described in which the engine runs upon parallel tracks of stone or iron, and thereon by other parallel lines of iron, and inside the first and projecting several inches from the rails.

[Printed, 1s. 2d. Drawings. See Rep. p. 129; also vol. 28 (second series) Encyclopædia, vol. 2, p. 396.]

A.D. 1825, November

BRANDRETH, THOMAS SHAW,

"constructing wheel carriages to be used

"for similar purposes."

This invention consists in the first place in fixing the hind wheels of a railway carriage upon an axle in the ordinary manner, and then placing above this axle a second axle on which are two "friction sheaves" having flat faces, these sheaves resting upon the axle of the bearing wheels, and sustaining the body of the carriage, such sheaves running upon the lower axle, between the naves of the wheels and certain inside collars. The axles of the sheaves and of the bearing wheels work in bearings which are supported in slotted brackets, projecting downwards, and connected at the lower ends with stays placed diagonally; the latter being connected at their upper ends by tie bars placed horizontally, and forming the main supporting beams of the carriage; being fastened by means of flanches to wooden cross beams upon which the floor of the carriage is laid. As regards the front wheels of the carriage the arrangement is similar, with the exception of there being in this case only one friction sheave, which rests upon the middle of the lower axle, working between two collars thereon. The sheaves are formed of iron, cast in iron cases or moulds, which gives smoothness and hardness to their faces, and the latter may, if preferred, be slightly rounded, so as to prevent the sheaves from "running on an edge," and the axles of the sheaves work in bushes of brass or soft cast-iron, which are so arranged as to have a slight amount of play in the bearing. Several advantages are mentioned as arising from the use of these bushes, and the parts of the invention mentioned above may all be applied to locomotive engines as well as to carriages.

The carriage body may either consist of a mere frame or platform on which may be placed bales, bags, or boxes of merchandise, or it may be composed of two boxes, "open to each other in the middle," and connected at the top by hinges, and at the bottom by bolts and shackles; one box resting upon the front and the other upon the hind wheels of the vehicle, and being capable, on the removal of the bolts and shackles, of separating at the lower parts (the framework being so arranged as to separate with them) and allow of the discharge of the load into a vessel or receptacle beneath, the parts being prevented from receding from each other too far by means of certain chains or jointed rods.

The patentee mentions that this mode of constructing the body of a carriage, "though new," he does not claim as being included

in his Patent, and also that the in  
 " roads and other similar roads,  
 " railroads."

[Printed, 6d. Drawing. See Reg.  
 p. 112; London Journal (Newton &  
 Mechanics' Encyclopedia, vol. 2, p.

A.D. 1830, September

CHURCH, WILLIAM.—" Certain  
 " tion of boats and other vessels  
 " are applicable to the construction

This invention consists in the  
 thin metallic plates in lieu of the  
 ing employed in building the hulls  
 carriages. In order to give the  
 plates of metal they are fluted, furrowed  
 and they are united together by  
 not only unite together these plates  
 combine with them on the outside  
 which are plain, and likewise bars  
 the corrugated plates on the inside  
 arranged so as to be air-tight.

sheets of metal may be used, and  
 sheets thin planks of wood may be used  
 the furrows of the corrugated sheets

In constructing the decks and  
 of corrugated metal, crossing each other  
 used, thus producing decks and

The invention is mentioned as the  
 tion of "carriages of various descriptions"  
 noticed here.

[Printed, 6d. Drawing. See London  
*series*), p. 66; and Register of A.D.  
 p. 41.]

A.D. 1835, March

CHURCH, WILLIAM.—" Improvements  
 " employed in the conveyance of  
 " or water, parts of which said improvements  
 " to the ordinary purposes of a  
 " apparatus."

This invention is described at considerable length, but relates only in part to the subject of the present series of Abridgments. One part of the invention which requires notice here relates to the wheels and axles of locomotive engines, and consists in mounting the wheels on separate tubular axles, which are fitted upon the crank shaft and locked thereto by clutches, that shaft passing through them to the outsides of the wheels, and the whole turning between antifriction rollers mounted in slings or boxes to which the springs of the engine are attached, the ends of these springs being connected by means of suspending rods to projections bolted to the sides of the boiler. These arrangements are described as being more particularly applicable to locomotives for common roads, but may be used also for railway engines; and for the latter buffers are also described, of which the rods are not only connected with strong curved springs passing across the framework, but are also furnished with pistons working in air cylinders, such springs each consisting of plates of different lengths placed one behind another.

Another part of the invention consists in constructing the carriage or framework of a locomotive engine of plates or sheets of iron, connected together by dovetailing their edges into grooved rods or bars of iron, such rods or bars forming the skeleton of the framework. Another part of the invention consists in the adaptation of an outer flange to each of the running wheels of a locomotive engine in addition to the inner flange ordinarily used, thus providing additional security against the engine being thrown off the rails by the wheels coming into contact with obstructions which may happen to be upon them.

Other parts of this invention relate to carriages for common roads, and will be noticed in the series of Abridgments relating thereto.

[Printed, 8s. Drawings. See London Journal (*Newton's*), vol. 8 (*continued series*), p. 386; and vol. 9 (*continued series*), pp. 237 and 313; *Rolls Chapel Reports*, 7th Report, p. 160.]

A.D. 1835, May 9.—N° 6828.

SIMPSON, WILLIAM. — "A safety drag or lever slide for "carriages."

In this invention a large bent lever is employed, which is mounted upon a fulcrum below the hind axle of a carriage, one arm then projecting diagonally backwards and downwards, and



the other arm, which is longer than under the body of the carriage mentioned carries a shoe or drag, arm a chain, strap, or rope is connected onwards to a barrel furnished with in such a position that the winch of the vehicle, the result of turning the strap, or chain being coiled upon the longer arm of the lever, and descend and press the shoe upon the barrel is a ratchet wheel, and as to act upon the teeth of this motion of the barrel until it is no longer operate, when the catch of a pedal and other apparatus, and is reversed and the lever moved by means of a spring, again raising in order to increase the power of the pass from the barrel to a large pulley a smaller pulley, a second chain latter to the lever, and the shoe in weather. The patentee mentions " motive engines, or where great weight be placed on each side of the etc

[Printed, 6d. Drawing. See London journal series), p. 205.]

A.D. 1836, October

ADAMS, WILLIAM BRIDGES. " wheel carriages."

This invention relates, firstly, to and consists in making the body of " half bodies, whereof each one is " in its own axletree and pair of large diameter, the two half bodies " joint work at the floor and at the vehicle readily adapting itself to the two parts being, moreover, so connected from end to end of the whole vehicle so extended as to project over a con-

floor of the other, and the sides of the two portions of the vehicle being connected together by flexible material. The joints each have "a prominence on the upper half or portion thereof, accurately fitted into a corresponding hollow cavity in the lower half or portion of the same joint."

Another part of the invention relates to the construction of a spring suitable for wheeled carriages, which consists of "a bended bow, of any eligible elastic material, the two ends of which are connected by an elastic or non-elastic cord, strap, band, or chain of metal links, the middle part of the bow being affixed to that part of the carriage which is provided for supporting the spring, and the weight of the body of the carriage being supported by the middle of the cord of the bow." Or the middle part of the cord may be suspended on the support, and the middle part of the spring affixed to the body. The tension of the spring may be regulated by tightening or slackening the cord by means of screws or otherwise.

Further, the invention relates to the construction of cranked or bended axletrees, and consists in forming such an axletree "of two broad but comparatively thin bars, disposed edgeway upwards with a space between them," such space being filled with wood, or partially occupied by blocks of wood or tubes of iron, the whole being secured together by bolts. Cranked or bended axles are also described as being formed in parts, joined together by overlapping at the bends, and by bolts.

Another part of the invention relates to the construction of a two-wheeled cabriolet, to be drawn by one horse and driven by a person behind the body, the reins passing over the roof, and the driver either standing on a board or being seated, or reclining against a strap or bar behind the entrance door, which is at the back of the body, the front having a window, which, together with part of the roof, can be opened or closed at pleasure.

The invention also relates to the construction of four-wheeled waggons, each having "a compound jointed body made in two parts, the floor of one part lapping over the floor of the other part, and the overlapping parts being united by a central turning bolt," the axles being bent downwards so as to cause the body and its load to travel near the ground, and the loading and unloading being effected by means of an opening in one side or other of the wagon, near the middle of its length. The

of horizontal guide wheels, connected to the carriage and thus prevent the bearing off such rails, flanges upon the wheels being compensated with. The axles may be placed in the bodies of the vehicle, above the wheels, near to the ground, and the "revolving dippers," which are placed lower to the upper part of the

[Printed, 2s. 6d. Drawings.

A.D. 1838, 1

CAVAIGNAC, GODEFR  
"ments in apparatus for  
"purposes from one place  
"road cutting and embankment

One part of this invention is a waggon for the carriage of material, more particularly in arranging the material to be unloaded. The waggon has a framework which projects forward, the body is capable of turning about a horizontal axis, and is placed in an inclined position, in which position it is charged by the swinging of the dipper, which is suspended upon a horizontal axis, being retained in position

or handle when it is desired to unload the waggon, and serving also to restore the body to its horizontal position, in which it is retained while necessary by a hook. The other parts of the invention do not require notice here.

[Printed, 1s. 6d. Drawings.]

A.D. 1839, April 9.—N° 8023.

NASMYTH, JAMES.—“Certain improvements applicable to the bearings or journals of locomotive or other steam engines, which improvements are also applicable to the bearings or journals of machinery in general.”

This invention consists in a mode of encircling or surrounding the bearings or journals of locomotive and other engines, as well as those of machinery in general, with collars or rings of case-hardened iron or hardened steel in place of the brasses or “steps” usually employed, the “peculiar feature or novelty” of the invention being “the forming of such case-hardened iron or hardened steel collars or rings in two pieces, and fastening them in such a manner by means of a key or pin, that they are prevented from turning round upon the surface of the bearing or journal which they encircle.”

An arrangement applicable to the axle bearing of a locomotive engine is described in which the collar is divided into two parts, the ends being oblique, and secured to the bearing by means of a key, which is sunk for half its depth into the surface of the bearing, the other portion of such key entering a recess in the collar. The latter may, if preferred, be divided into more than two parts.

Similar arrangements are described as being applied to the crank and connecting rod of a locomotive engine, and may be adapted to other machinery.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 15 (*conjoined series*), p. 357; and *Inventors' Advocate*, vol. 1, p. 53.]

A.D. 1840, January 3.—N° 8333.

GREENWAY, CHARLES.—“Certain improvements in reducing friction in wheels of carriages, which improvements are also applicable to bearings and journals of machinery.”

According to one modification of this invention there are interposed between the axle and the interior of the axle box of a

carriage a number of rollers, which are spherical, or conoidal in shape, and to diminish the friction between the rollers are placed at equal distances, and are kept in their relative position by a piece of metal which nearly fills the inside of the box, and is provided with rollers work, the cradle being of such a shape as to project through it both on the side and end next the box, a suitable cap being necessary at each end of the box to prevent the rollers falling out of such box. In the present invention may be adapted for the reception of a number of rollers in line with each other, and one of the rollers is described in which the cradles are adapted having in them suitably formed rollers. In the present invention plates are placed together, forming a series of spherical rollers, this arrangement being adapted for application to a crane. The rollers, as well as the cradles, axle boxes, and the rollers may be desired to combine therewith, and the rollers by which great hardness of the rollers will be obtained, or they may be formed of any material. The invention may be applied to the rollers of "boxes and axles of carriages, and of swing bridges, turning plates of

[Printed, 8d. Drawing. See Invention.]

A.D. 1843, December

PARLBY, SAMUEL.—"Improvement in wheels for carriages."

This invention is described at the first place in forming the spokes of the wheels, one edge of each being bevelled off, so as to enter the nave of the wheel, and the spokes being bevelled, the nave of the wheel is formed by the parts of the spokes between two of the spokes, and is secured together by at least one pin, such pins passing entirely through the spokes and the nave of the wheel.

well as through the spokes. The central parts of the wheel are thus firmly united, independent of any box or axle which may afterwards be connected thereto.

As regards the rim of the wheel the invention consists in placing on each side of the outer parts of the spokes a flat ring of iron, and then uniting the spokes and rings by means of pins which pass through both rings and spokes, the spaces between the spokes being then filled up by segments of hard wood or any other suitable substance, these segments being "shaped like the keystone of an arch," the grain of the wood, when they are composed of wood, pointing towards the centre of the wheel, and the segments, like the spokes, being secured between the iron rings by pins. Both the outer ends of the spokes and the outer edges of the segments project beyond the rings in some cases, and are in such cases surrounded by an iron tire, which may either be plain and adapted to run on a common road, or flanged so as to be suitable for working upon a railway. In other cases the rings extend to the ends of the spokes and the outer edges of the segments, and will thus bear upon the road equally with them, one of the rings being, for railway purposes, however, made to project beyond the segments and spokes, and so serve as a flange to the wheel. These arrangements may all be variously modified, the outer ends of the spokes being in some cases shod with iron, and furnished with shoulders against which the rings may rest, and when the segments and spokes are surrounded by an iron tire the wood of the segments may have the grain lengthwise, instead of the grain pointing towards the centre of the wheel, as mentioned above. The segments may be composed of leather, felt, or other elastic substance, "cemented and compressed together with great force" in moulds of suitable form.

An improved axle box is described, which, however, is not claimed by the patentee, this box being tubular in the part meant to contain the arm of the axle, but having at its outer end a "hemispherical oil cavity," the end of the axle being convex, so as to fit against the interior side of the oil cavity, and there being a groove in the arm of the axle to facilitate the distribution of oil around the arm. No linch pin is required for the axle, as a collar fixed or formed upon the axle works within a hollow piece of metal fixed upon the inner end of the box by screwing or otherwise. The oil is introduced into the oil cavity through a hole which is afterwards closed by a screw plug, and within the



"bearings, steps, and  
"and other machinery  
"same."

One part of this is  
alloys to be used in  
rubbing surfaces.  
some cases composed  
other cases of the  
copper. In other  
nickel. The proportions  
may be varied.

Another part of  
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when put together  
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skeleton framing,  
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and made of soft

tube containing the bar of lubricating material being attached to the lower part of the axle-box, and the bar being constantly pressed upwards against the journal of the axle by means of a kind of small piston and a helical spring. A case is attached to the top of the tube, to prevent the access of dirt to the journal.

That part of the invention which relates to steam boilers does not require notice here.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 305.]

A.D. 1846, August 15.—N° 11,336.

AITKEN, WILLIAM.—“ Certain improvements in two and four-wheeled carriages.”

This invention consists, firstly, of certain improved combinations of materials to be employed in the formation of the body parts of two and four-wheeled carriages, the object being to increase the strength of such parts while rendering them lighter than those usually constructed. The framework is composed of outer parts of iron combined with inner parts or linings of wood. The iron is of three different forms, the first being angle iron, the second of the U form, and the third of the flanged U form; and these may be used in various modes, and combined with panels composed of iron plates. If desired, the flanged U form of iron may be used without the wood filling, and the panels be connected to the flanges. The iron work is japanned either before or after the parts are put together, the customary process of painting being thus avoided.

Another part of the invention consists of certain improved spring bearings for carriages. These bearings are each composed essentially of a bar or plate which is placed under the carriage body or frame, and has projecting downwards from it two tubes, these passing through eyes in a shackle bar, in which they are free to move up and down, there being placed around each tube two helical springs, one above the other, the upper being lighter and more compressible than the lower spring, and each spring being surrounded by an outer tube, one of which slides within the other as the springs are acted upon.

Another part of the invention relates to the construction of the wheels of carriages. In one case a nave is provided with a bush which is either cast upon a mandril for the purpose of hardening the rubbing parts, or cast soft and then bored out and case-

hardened. This nave is furnished with a hole for the oil orifice, and flange plates of a "a" shape, a tube of malleable iron at the end of the bush, and projecting being screwed inside for the purpose of a brass nut which is made in having been previously inserted rendering the latter oil-tight; and the same office at the outer end of a combination of U iron and the nave by means of spokes, or rods of iron, the lower ends of the flanges of the saucer-shaped plates, while at the upper ends the spokes being a single piece, which is put in the wood of the felloe, and secured in the wood. An iron tyre is then put on in the usual manner.

" In the case of railway wheels every respect the same as those of the ordinary wheels, and have a flanged tyre of the same shape.

In another modification of the tyre and wooden part of the wheel, the tyre of sea-horse leather, gutta serena being placed around the wheel, and the whole being "noiseless."

Another part of the invention is a compound axle for carriages, which consists of an oblong plate of iron so shaped as to form a tube, this being turned up to the axle, and furnished with a screw at the end to the wheel, the other part of the axle being of the same form. A second plate is then put on the two placed together, pieces of wood being inserted between them, the outer ends of the axle, while the other part of the axle the two fit together inside the U shaped plate being also inserted between the two plates of metal, and the whole being united by a screw.

[Printed, 10d. Drawing. See Mechanical Engineering, vol. 5, p. 85; Patent Journal, vol. 1, p. 100.]

A.D. 1846, November 19.—N° 11,455.

**BROCKEDON, WILLIAM, and HANCOCK, THOMAS.**—"Improvements in the manufacture of articles where india-rubber or gutta percha is used."

This invention consists in "peculiar means of applying these substances to a variety of purposes to which they have not heretofore been so applied, by means of the processes described in the Specification of a Patent granted to Mr. Alexander Parkes, dated the Twenty-fifth day of March, One thousand eight hundred and forty-six, entitled 'Improvements in the preparation of certain vegetable and animal substances, and in certain combinations of the same substances alone or with other matters.' The processes enumerated in this patent produce certain changes in the qualities of caoutchouc and gutta percha, some of them similar to those produced by sulphur and heat in the process now termed 'vulcanizing,' in others purifying and colouring those substances, and by these means rendering them suitable to a great variety of purposes."

The Specification of this invention is of great length, and extremely vague and diffuse, the patents of Thomas Hancock, of the 18th April, 1837, of the 23rd of January, 1838, of the 21st of November, 1843, and of the 18th of March, 1846, being referred to, as well as the patent of Alexander Parkes, already mentioned. The particulars which constitute the present invention are not specially pointed out, but one part of the invention would seem to consist in rendering cloth, silk, and other "manufactured" fabrics waterproof in place of operating upon the raw materials of such fabrics before manufacture, as practised under Parkes' and Hancocks' inventions, such fabrics being rendered waterproof by immersion in the "changing solvents," but being protected from injury during the process by being coated with glue, size, or an aqueous solution of lac, which is afterwards removed by the use of an alkaline solution. Printed or dyed fabrics which require to be coated on one side only have the selvages joined together, the seam being rendered waterproof, and are then immersed in "this bag-like form," and the effect of the changing solvent upon any particular part of the fabric immersed may be prevented by the application thereto of size or the solution of lac. Manufactured fabrics may thus be coated or united together in two or more thicknesses, and this part of the invention may be applied to a

variety of purposes, such as the articles of dress, "carriage roof pads, and other objects. When or sewed together the junction the application thereto of the requiring to be inflated, such linings rendered waterproof by the solvent. Articles intended fluids may be formed of caoutchouc of the two, and then immersed, any of the articles mentioned all gritty or colouring matters and with the other materials if required made into sheets, and the articles produced therefrom; washers for hose pipes and tubing, railway among the articles thus obtained "and railway buffers." Such threads, and otherwise treated for

In one part of the Specification when an article is to be made end use of solvents they operate in Montgomery when he introduced Arts in the year 1843, the gutta "boiling," when it may readily or  $140^{\circ}$  into any required shape, temperature below  $110^{\circ}$ . The greater part has reference to matters which have of the present series of abridgments

[Printed, &c. No Drawings. See Rep. p. 103; and Mechanics' Magazine,

A.D. 1846, November

PIDDING, WILLIAM.—"Certain

According to one part of this furnished with a number of rollers in the ends of links which form rollers serving as wheels to the travelling around an oblong frame carriage, those rollers which are for

resting upon the rails. These rollers are not flanged, and the carriage is therefore provided with horizontal guide wheels, or guide plates, which work inside the rails, and prevent the carriage from leaving such rails. The patentee also proposes to apply, in some cases, in combination with the parts mentioned above, an endless band of steel, gauze, leather, or other suitable material passing between the lower rollers and the rails, and over the upper surface of the upper rollers, and also round certain other rollers mounted at the ends of the frame, the object of this apparently being to facilitate the traverse of the rollers and links around such frame.

The other parts of the invention relate solely to carriages for common roads, and will be noticed in the series of Abridgments relating thereto.

[Printed, 1s. Drawings. See *Mechanics' Magazine*, vol. 40, p. 97.]

A.D. 1847, April 8.—N° 11,649.

DE BERGUE, CHARLES, and HADDAN, JOHN COOPER.—  
“Improvements in wheeled carriages, and in panels and springs  
“for carriages and other purposes.”

This invention relates in the first place to an improved mode of constructing the framework of railway carriages, and consists in fitting and joining together the pieces of timber of which such framework is composed, by means of an improved cylindrical tenons and mortises, and also in an improved mode of making the shoulders and faces which are intended to fit together square and true, a certain machine or apparatus, and certain tools being described as being used in carrying out this part of the invention. This machine consists essentially of a revolving shaft, to which cutters of different forms may be attached, such shafts being mounted in bearings carried by a lever, by moving which the cutters may be brought into different positions, the revolving shaft and cutters being also propelled forward when requisite by means of a screw. The patentees state that by these arrangements much of the labour usually required in planing and preparing the timbers is rendered unnecessary.

Secondly, the invention relates to an improved mode of manufacturing papier machée panels to be used for carriage and other purposes, and consists in placing a piece of papier machée, intended for a panel, while in a moist state, in a suitable frame



by which it may be held flat, dry, and being rendered flat a panel adhering to the frame.

Thirdly, the invention relates to springs for carriages and other vehicles, the different pieces of steel of which the spring is composed being made out of plates in such manner that the ends of the pieces are produced with flat surfaces, instead of being chamfered. This construction of spring is applicable for buffers.

Fourthly, the invention consists in the use of pieces of india-rubber for the springs of a railway or other carriage. The carriage is bolted two struts, answering as scroll irons, and a box or hollow cylinder, inside of which are india-rubber and metal rings. The cylinder, which is connected to a sliding box, the bolts, when the weight of the carriage is applied to the bar and parts in connection therewith, the rubber to be compressed, such as the carriage.

Fifthly, the invention relates to a device suitable for railway stations or other places, essentially of two long horizontal plates of brickwork or masonry, between them a large number of india-rubber separating plates, a cross beam or bar to be capable of aliding thereon, and a carriage that should an engine or carriage strike it will strike the cross beam, pressing the india-rubber ring and thus absorbing the shock of the collision. The carriage returning violently to its first position by means of racks and pinions, or round fixed bars, or any other device.

Other parts of the invention relate to gun breechings, and to springs

of ships, but there is nothing in these parts of the invention which requires notice here.

[Printed, 2s. 2d. Drawings.]

A.D. 1847, April 20.—N° 11,662.

**WOODS, JOSEPH.**—(*A communication.*)—"Certain improvements in springs for supporting heavy bodies, and resisting sudden and continuous pressure."

This invention consists in forming springs "of flat pieces of steel, of equal breadth and thickness throughout, except at the two ends, and arranging the same in such manner that the motion caused by pressure shall tend to deflect the plate in reference to its breadth instead of its thickness as hitherto." The patentee effects this by employing "a plate of steel wound round a cylindrical, square, or other shaped bar in a spiral or volute form, after which it is hardened and tempered by the ordinary process employed in the making of springs. When the spiral form is adopted, the apex and base of the spiral approximate or approach other by the addition of pressure, and when loaded with as much as the elasticity of the steel will allow it to resist, the spring will assume the form of a volute curve." When the volute form of spring is adopted, the addition of pressure will extend the interior coils, "so as to cause the spring to assume a spiral form of increasing height as the pressure is increased."

In order to form spiral springs, a mandril of the form and dimensions of the inside of the proposed spring is used, such mandril being furnished with a wrought iron stem or collar and a cotter, and the plate to be used for the spring, having had its end turned or forged so as to fit the stem, is tightly fixed by the collar and cotter, and then hammered or rolled round the mandril while hot, being hardened and tempered afterwards in the usual manner. In making a volute spring, the plate is hammered or rolled round a mandril so that the edges remain in the same plane.

These springs are described as being applicable to a variety of objects, among which are mentioned the bearing springs of railway and other carriages, as well as railway buffer and draw springs.

[Printed, 10d. Drawing. See London Journal (*Newton's*), vol. 31 (*conjoined series*), p. 414.]

A.D. 1847, November 25.—N° 11,

HUTCHISON, WILLIAM.—(*A communication*)  
 " in treating pasteboard and other substances  
 " compact and impervious to wet, frost, vermin  
 " agents."

According to one part of this invention pasteboard suitable for use in the construction of railway and as well as for other purposes, by being first through a chamber heated to from sixty to one hundred degrees Fahrenheit. Such pasteboard may be "worked" to the shape, form, or device required, before or after submitting it to the drying process," and then dried is immersed in a boiling solution or mixture composed of seventy-five parts of resin or pitch and 25 of oil, tallow, or other greasy matter, with the addition, or separately, of pounded stone, chalk, slate, &c. dried. The patentee states that glue, gums, and other substances may be used instead of the resin or pitch, and prefers to use the resin or pitch, and to mix with it some vegetable or mineral colouring matter, which is applied to the pasteboard to either a light or a dark colour, the pasteboard being immersed in the composition, and being able to resist the action of air, water, frost, and other destructive agents.

In addition to pasteboard, paper, old rags, tow, ropes, and cordage, hay, straw, and other materials, either mixed together or not, and formed into any shape may be similarly treated, such materials being "substance" by being boiled or mashed together, and then shaped to the desired figure, being then dried, and submitted to the action of the composition as above. Plaster of Paris, stone, chalk, and other substances may be similarly treated.

[Printed, *with* No Drawings. See London Journal (*Verdun series*), p. 292; Patent Journal, vol. 4, p. 455 pp. 36 and 182.]

A.D. 1849, June 20.—N° 12,661

CAMPBELL, ALEXANDER FRANCIS. — "In  
 " wheels, ploughs, and harrows, in steam boilers  
 " for propelling vessels."

According to the first part of this invention a wheel is formed which may be used either on a common road or upon a railway. The wheel has "compound spokes," each of which is formed by bending a flat bar of iron in such a manner that the two ends which are turned outwards may be united to the nave by means of hoops and bolts, the rest by the bar extending towards the ring or tire of the wheel in two lines which gradually approach each other, the central part of the bar forming a short cross bar for supporting such ring or tire. Between the spokes and the ring, however, the ends of tie bars or rods are inserted, these bars passing in straight lines from the top of one spoke to the top of another, and the whole being secured by rivets passing through the spokes, the tie bars, and the ring or tire. When the wheel is intended for railway purposes a suitable flange is bolted to the upper parts of the spokes on one side of the wheel, such flange being sufficiently wide to extend beyond the ring or tire.

Another part of the invention relates to placing a flexible ring or tube containing water around the circumference of a carriage wheel. This tube rests on a grooved ring of india-rubber, wood, or gutta percha fixed around the rim or tire of the wheel, being retained therein by straps of vulcanized india-rubber secured to the rim of the wheel by circular plates and screws. The tube itself is composed by preference of gutta percha. Wheels thus formed appear to be meant for use on common roads only. The other parts of the invention do not require notice here.

[Printed, 3s. 4d. Drawings. See *Mechanics' Magazine*, vol. 51, p. 616; and *Patent Journal*, vol. 8, p. 200.]

A.D. 1849, July 7.—N° 12,699.

FULLER, EDWARD IVES, and TABERNACLE, GEORGE.—  
"Certain improvements in metallic springs for carriages."

The object of this invention is to obviate as far as possible the unpleasant effect of the recoil of carriage springs when in action, "as the recoil of springs as at present constructed and adapted to carriages produces much uneasiness of motion, and frequently occasions the springs to break or become strained or injured," and the invention consists in "connecting the springs at one or both ends to each other when two springs are employed, or to a rigid bar when only one spring is used, in such a manner that the ends of the springs may have sufficient play horizontally

" when they elongate or flatten  
" free action may not be checked  
" when the ends of the springs  
" as is now generally the case."

The patentees state that various inventions may be devised, and of the invention, in one case a slot is applied to the end of the under spring and the upper spring working in the slot, applied both to a double elliptical spring the latter consisting of a single spring jointed to one end of a curved spring being furnished with a guide bar.

The patentees mention that for ordinary purposes it will generally be found desirable to connect the two springs together at one end and leave all the horizontal play for the other end, that in some cases, when the springs are in boxes at or near their middle, it will be found desirable to connect the two springs.

An adaptation of the invention is shown in which the springs are secured to the axle guards in such manner as to leave space between the horns, each horn being provided with a stud or bolt, which is secured to the under side of the carriage body. The invention may also be modified for use in carriages for ordinary roads. An adaptation is shown in which the ends of carriage springs are connected to a bell-crank lever " and one end of a bell-crank lever may work freely on these horns, the lever being meant as a substitute for either of the two springs employed, or the slotted bearing mentioned above. The right hand end of the lever or fulcrum pin of the bell-crank lever is connected to the upper spring is connected to the

A.D. 1849, November 24.—N° 12,861.

COWPER, CHARLES.—(*A communication.*)—"Certain improvements in piling, fagotting, and forging iron for plates, bars, shafts, axles, tyres, cannons, anchors, and other similar purposes."

This invention relates, firstly, to "certain new forms and arrangements of bars for the construction of piles and faggots for the manufacture of iron generally." In place of employing "flat bars, of a square or rectangular section, or of the form of a sector of a circle, as has hitherto been customary," the patentee employs "bars whose section is a trapezium, arranged in a great variety of ways," as requisite for the production of the intended article, whether an axle, a plate, or other object. The bars are formed by rolling, the rolls being provided with grooves of the proper shape. Various modes of applying this part of the invention are described, but the arrangements relate for the most part to matters which have no connection with the subject of the present series of abridgments.

Another part of the invention relates to the formation of wheel tyres. A flat bar of iron is first heated and then wound in a helical form around a mandril, the bar being "placed on edge." The bar thus wound is then placed in a die, and squeezed into every part thereof by the action of a hammer, a ring being thus obtained which is cylindrical in the interior, but with a flange on the exterior, this ring being then enlarged by submitting it to the action of two rolls, one of which is of the form of the interior and the other of the exterior of the tyre. These rolls may be variously constructed and arranged, and form no part of the present invention.

Another part of the invention relates to the manufacture of wrought iron wheels. A ring of iron is first formed by winding up a bar upon a mandril as mentioned above, and hammering it so as to weld the coils firmly together. A second ring, of smaller diameter but much thicker than the first, is now prepared in a similar manner, and is placed within the first, and hammered so as to cause it to spread and become united with the outer ring, the compound ring thus obtained being now submitted to a succession of swaging operations by which it is gradually converted into a complete wheel, having a nave in the centre and a



plate may be used of which a la end is left flat, "that is, without

[Printed, 1s. 4d. Drawings. See and 421; and vol. 55, p. 130; Pra

A.D. 1851, January

DAVIES, DAVID,—“Certain in  
“ of wheel carriages, and in app

One part only of this invention  
sisting of “a break applicable to  
the invention forming an improv  
carriages which was registered by  
Designs Copyright Act, Victoria  
17th of December, 1840.

An arrangement is described  
mounted upon four wheels, has  
or break, of which there are two  
connected to levers, mounted  
the carriage, of which four, w  
others, and are connected to th  
wheels, or those next the ends of  
inner ends to short links, by whi  
nuts placed upon right and left  
shaft which passes midway acro  
of the arrangement being that  
the nuts cause the inner ends of  
other, and the other ends of a  
form, to press the breaks connec  
The other four breaks are at th  
inner sides of the wheels by n  
shorter than the first, and are pu  
on the longer levers enter, the  
longer levers, causing the short  
therewith.

The other parts of the inventi  
of an “urinal” to carriages, with  
solely to carriages for common  
series of abridgments relating th

[Printed, 10d. Drawing. See Mec  
Journal, vol. 11, p. 223.]

A.D. 1851, February 10.—N° 13,500.

**NORRIS, RICHARD STUART.**—"Certain improvements in the  
" construction of the permanent way of railways, bridges, locks,  
" and other erections wholly or in part constructed of metal;  
" also improvements in brakes for railway carriages."

Although the words "brakes for railway carriages" appear in the title, the Specification does not describe any improvements in brakes.

[Printed, 10d. Drawings.]

A.D. 1851, February 11.—N° 13,510.

**WEBSTER, JAMES.**—"Improvements in the construction and  
" means of applying carriage and certain other springs."

This invention is described at some length, and under various modifications, but consists essentially in so constructing carriage and other springs that each point or arm of each spring shall act against an inclined plane when in operation. When such a spring is used as a bearing spring the spring may be attached to the sustaining body and the inclines to the body to be sustained; or the spring may be connected to the latter, and the inclines to the sustaining body.

A spring is described, in the first place, as being composed of a straight horizontal part which forms the base, and two curved arms, one of which rises from each end of the base, the upper ends of the arms being slightly bent towards each other, and entering between two inclined planes placed above the spring, the arrangement being such that the depression of the inclined planes will force the arms of the springs towards each other, the latter thus forming in fact an elastic support to the inclined planes. Thus a spring so formed may be fixed upon the axle box of a railway carriage, and the inclines project downwards from the framing of such carriage. Such a spring may also be applied as a draw spring, the spring itself being connected to the framing of the carriage, and the inclines to the draw bar; and similar springs may also be attached to the buffer rods of railway carriages, and act, when the rods are thrust inwards, against inclines bolted to the framework. A stationary buffer is also described, in which a fixed cylinder has within it two inclines, and also two springs, a moveable cylinder being placed within the

other. In order to avoid the injurious ends of the springs, they may be furnished with guides, and if desirable the inclines may be made to rise and fall upon the spring whether depressed or elevated, to prevent any jerking action upon the rising or falling of the depression. Instead of the sides of the carriage being straight lines they may be slightly curved, in which case the inclines upon the springs will increase or decrease.

The invention is also described as being applicable to a machine.

[Printed, 1s. Drawings. See Repertory of Patents, vol. 54, p. 125; Mechanics' Magazine, vol. 54, p. 125; p. 252.]

A.D. 1851, April 26.—

LYALL, JAMES BAGSTER—"An improved public carriage."

The first part of this invention consists in the internal parts of a railway carriage that is adapted for four lines, extending from one end of the carriage to the other, those occupying the central lines of seats, while those on the outer lines of seats are adapted to the sides of the vehicle.

Another part of the invention consists in the carriages of iron, ribs of T-iron furnished with the following parts:

In one arrangement brakes are brought to bear upon the hinder wheels of a common road carriage through the medium of chains which connect the horse collars with certain rods, the arrangement being such that when the horses attempt to stop the carriage its speed is immediately arrested by the pressure of the brakes against the hinder wheels of the carriage, springs removing the brakes from the wheels when the carriage is again drawn forward and the chains slackened. Brakes are also described as applicable to the fore parts of the hinder wheels, in which case the arrangement is such that when the horses move the carriage forward the brakes drop from the wheels without the use of springs.

According to another part of the invention the buffers of a railway carriage are provided with supplementary or "collision" springs, the latter being much stronger than the ordinary springs, and being meant to come into action only in extreme cases. And in connection with this part of the invention are brakes, which, through the medium of springs and levers, are brought into action upon the wheels when the buffers are acted upon by any extraordinary force, these brakes, when such force ceases to act, falling away from the wheels "by their own weight."

[Printed, 1s. 2d. Drawings. See *Mechanics' Magazine*, vol. 55, p. 386; *Patent Journal*, vol. 12, p. 63.]

A.D. 1852, April 24.—No 14,088.

MARCESCHEAU, ARMAND JEAN BAPTISTE LOUIS.—"Improvements in the mode of conveying letters, letter bags, and other light parcels and articles."

The apparatus employed for the purpose of this invention consists, in the first place, of a line or row of grooved wheels extending between the points between which communication is desired, each wheel being placed upon a horizontal axis mounted in suitable bearings, and the whole line of wheels being caused to rotate in the same direction by means of an endless rope, which in its course is passed around small pulleys fixed upon the axes of the wheels, the endless rope also passing round a drum by which it is actuated, and which receives motion from any suitable machinery. In addition to this mechanism are other wheels, having one flange only, and mounted upon vertical axes, there being also upon the latter smaller pulleys round which the driving rope passes, these wheels being thus caused to rotate

simultaneously with those first reception of the letters or other according to one modification box or vessel, with pointed end a narrow boat. The keel mentioned by the rotation of w the wheels with one flange of prevent the vehicle from overtur are placed in boxes or parcels nected, having cross bars attad That parcel which has to be placed at the back part of th parcel being longer than those front of it, the others being ar of each parcel being shorter th arriving at the point or station removed, the rollers of the of certain inclined rails supported raising the parcel from the v line of rails from which it a similar operation takes place w rails being in this case lower th shorter length of the bars of are removed in succession by lower than the set behind the parcel.

The invention is set forth a modifications. In some cases raised upon props, and the v guide wheels which work upon rails. Arrangements are also, and descending frame furnish transfer vehicles to and from points of a line, such a frame, also employed to conduct the v station. The moving power a steam engine, or "a carriage" acting plane." The arrangement may travel either in straight li

A.D. 1852, June 12.—N° 14,165.

DIXON, EDWIN JOHN JEFFREY, and DODSON, ARTHUR JOHN.—“Improvements in machinery and apparatus used in “quarrying slate and stone, and in cutting, dressing, planing “framing, and otherwise working and treating slate and stone, “and in apparatus and waggons used for moving and conveying “slate and stone, and improvements in joining, framing, and “connecting slate and stone.”

That part of this invention which relates to waggons, consists, in the first place, in constructing such waggons “without any “under or ‘carriage framing’ upon which to build up the wag- “gon,” an iron plate forming the bottom of the waggon, there being underneath this two longitudinal beams, and the ends of these beams projecting beyond the plate and serving as buffers, bands of iron being placed around the beams near such ends in order to strengthen them. To the lower sides of these beams are attached bushes for the reception of the ends of the axles, the bolts which secure these in their places passing through both beams and plate, and to the sides of the beams are attached iron loops into which stauncheons enter, the latter supporting the sides of the waggon, the ends being sustained by other stauncheons which enter sockets bolted to the ends of the iron plate, a “draught “iron being also connected to the latter.” A truck may be constructed in a similar manner, the sides and ends being omitted, or a waggon may be at any time converted into a truck by lifting the stauncheons which support the sides and ends out of the loops and sockets already mentioned. In order to lubricate the axles each of the latter is bored at the ends so as to have an opening extending for some distance inside it, a hole leading from each opening to one of the axle bushes or bearings. Each opening has a “breach” screwed into it at the end of the axle, there being a hole through this breach of considerably less diameter than that of the opening, through which oil is squirted for the lubrication of the axle, the breach preventing its return. And if it be desired that the wheels shall be loose upon the axles, a second hole is made to lead from each opening in the axles for the purpose of conveying oil to the insides of the “boxes” or naves of the wheels. The latter are gooved so as to be capable of running upon rails composed of round bars, the waggons being apparently meant for travelling upon such rails.



The other parts of this invention of considerable length, contain nothing

[Printed, 4s. 6d.] Drawings. See M

A.D. 1852, July

NEWTON, WILLIAM EDWARD

" improvements in the construction of  
" This invention " relates principally  
" to the joining or connecting together  
" of the wheels which the wheels are composed

The invention comprises " various secondary matters of construction which consists, firstly, in the employment of a rim of iron throughout its length, and having shoulders at each end, with other shoulders which embrace the axle boxes. Secondly, of an axle box being provided with a shoulder embracing the axle and keeping the axle box being provided with a shoulder embracing the axle, and serves to support this shoulder and the adjacent part of the wheel of cast iron or other material in such manner as to receive and hold the spokes, whereby the latter are prevented from deteriorating and thrown out of shape on reason of the expansion of the metal. Thirdly, the wooden filling pieces are secured by being, moreover, slightly enlarged at the ends to be more firm.

The secondary objects relate to the arrangement of certain screw bolts by which the metal nave is closed and the axle is formed with T-shaped heads, which are covered by a ring, the bolts of which are pressed tightly against the axle and leather disc tightly against the axle. A part of the invention relates to a screw plug which closes the front of the axle but which may be removed for the purpose of such plug being screwed into the

the front of which forms an oil chamber, and the plug having a large disc-like head, behind which is apparently a leather washer. A third point relates to the employment of a certain band by which the two halves of the axle box are held together, this band being held in place by the metal ring and leather disc and T-headed bolts mentioned above.

[Printed, 10d. Drawing. See *Mechanics' Magazine*, vol. 58, pp. 137.]

A.D. 1853, June 7.—No 1394.

LEVERSON, GEORGE BAZETT COLVIN.—(*A communication.*)  
—"A new application, construction, and arrangement of springs  
"for carriages and such like purposes."

This invention consists of "a certain new application, construction, or arrangement of compressible springs in combination with  
"an elastic bar or toggle joint."

One modification of this invention is described in which an elastic bar or spring of steel, curved upwards in the middle, is formed near each end into a screw, each screwed part carrying a flange which is screwed upon it, and fixed in its place by a nut. Beyond the screwed part of each bar or spring is a plain part, which enters a metallic tube provided near its further end with a projecting flange, and at the end with a projecting piece by which it is jointed to a support which rises vertically from a rigid bar or rod. Around each tube is placed a ring or tube of india-rubber, or a helical spring, and the result of the whole arrangement is that upon pressure being applied to the middle of the elastic bar or spring, which, as mentioned above, is curved upwards; such pressure tends to straighten such bar or spring, and to force the ends outwards, this causing the flanges near the ends to compress the tubes of india-rubber or the helical springs between themselves and the flanges upon the metallic tubes, an elastic resistance being thus offered to the straightening of the bar or spring first mentioned. Instead of such bar or spring, two rigid rods or levers, connected together so as to form a toggle joint, may be used, and springs thus formed may be applied not only as bearing springs both for ordinary and railway carriages, but to the seats of carriages and chairs, the floors of ball rooms, as door springs, and for many other purposes. Several modes of applying such springs to railway and other carriages are set forth.

[Printed, 8d. Drawing.]

A.D. 1853, Jan

WEBB, JOSEPH. — (*Provisional*)

"ments in obtaining motive power  
This invention consists "in re-  
"power or weight of bodies for  
"sufficient to put them into  
"or any other force hitherto  
"thereto."

The application of this invention  
on railways is mentioned, the  
"the principle of construction  
"arranging the carriages as the  
"which has hitherto been borne  
"upon the heads of plungers  
"with which there are to be  
"pistons," the intention being  
"carriages move along the rails  
"compress the air contained in  
"used as the motive power for  
[Printed, 4d. No Drawings.]

A.D. 1854, Oct

PROUST, PIERRE ETIENNE.

"greasing or lubricating axle  
"carriages and of machinery."

This invention relates to  
preventing the journals of axles  
machinery from becoming heated  
cooling matter, such apparatus  
"and when required, the intro-  
"box or lubricating vessel."  
syphon, one branch of which is  
other into an air-tight vessel fitted  
greasing apparatus, and filled  
reason, desiring this invention  
"lubricating system."

The patentee describes the  
reference to the grease box of axle  
itself is of the ordinary character  
around it sufficient to contain

chamber being in the first instance filled with water through an opening provided for the purpose, and which is afterwards closed by any suitable means so as to be air-tight. A syphon is arranged with its longer leg extending down into the lower part of the grease box, the shorter leg passing into the water reservoir, and thus upon the friction of the axle causing undue heat, the water being heated also, causes the steam arising therefrom to exert such pressure upon the water in the chamber as to force a quantity of the water through the syphon into the lower part of the grease box, this water mingling in its heated state with such grease as may remain in the box, and the two then serving to prevent the axle from becoming "over hot."

The invention may be applied to the bearings of shafts, the pedestals of screw propellers, paddle wheels, and other parts of machinery.

[Printed, 1s. Drawings.]

A.D. 1854, December 19.—N<sup>o</sup> 2674.

GLOVER, FREDERICK ROBERT AUGUSTUS.—"Improvements  
" in or applicable to the construction of carriages."

This invention relates to the adaptation to four wheeled and other carriages of the springs or spring shafts, for which a patent was granted to the present patentee, A.D. 1854, April 7th, No. 807, "and to the necessary alterations and modifications of such  
" carriages for the suitable application and adaption of such  
" springs or spring shafts."

As regards railway carriages, whether made with four or more wheels, the invention consists in furnishing them with the already patented springs, "by fixing or securing the closed or connected  
" end of each spring to the under frame, and one of the open  
" ends to the under frame, in such manner as to allow of the  
" necessary play or action of the spring."

As regards other carriages, the invention consists in supplying them with such springs by "securing to the hind axle one of  
" the open ends of each spring employed at the said axle, and the  
" other open end to the body, and by fixing or securing the closed  
" or connected end of each spring so employed to the frame or  
" body in such manner as to allow of the necessary play or action  
" of the spring;" and, further, in supplying carriages requiring shafts with the improved spring shafts, "one of the open ends of

" each spring being secured to  
" moveable or turning frame of  
[Printed, 8d. Drawings.]

A.D. 1856, September

TAYLOR, JOHN GEORGE. —  
" connectors, and couplings, and

The first part of this invention is a piece of steel until the ends meet and are formed of which the sides are beveled elsewhere, the ends being beveled one end being pressed against a spring which is connected to the one end of the loop away from the introduced into the loop, and the inside the loop being allowed to come together, and thus a connection is made and any other article, one applying being set forth in which such a device connecting together a series of links used for conveying signals from one to another.

Another species of fastening is a hook, the shank of which is connected to a second ring working loosely in a sleeve, desired, to embrace the point of a ring from escaping from any article to which it is placed.

The invention also embraces a single piece of metal, and consists of other modifications of the invention, tongues, securing purses and wallets, being also described as being connected together by double-hooks.

The invention is mentioned in connection with coupling railway carriages, no particular application of the invention although the first and second drawings obviously be used for such purposes.

[Printed, 10d. Drawings.]

A.D. 1864, December 8.—N° 3060.

**CROCKFORD, CHARLES.**—“Improvements in traction on “railways, more especially adapted to steep gradients.”

According to one part of this invention the driving wheels of locomotives are each formed with tyres of much greater width than usual, that part of the tyre next the flange resting upon the ordinary rail in the ordinary manner, while the outer part of the tyre is grooved, and works upon an outer and supplementary rail, the upper part or surface of which is of angular form, or of other shape so adapted to the grooved part of the tyre that the latter, in working thereon, exerts a larger amount of tractive power than an ordinary wheel. The supplementary rails are only meant to be used when the engine is ascending an incline, or is otherwise required to exert great power, and they are so arranged that the grooved portions of the tyres pass upon them by means of inclines, the supplementary being higher than the ordinary rails, and the wheels being raised entirely off the ordinary rails when the supplementary rails are in use.

This arrangement may be modified by having a wheel of the ordinary character to work upon the ordinary rail, and a grooved wheel of much smaller size placed on the crank axle outside it, the axle being lengthened for the purpose, and the supplementary rail being raised much higher than the ordinary rail. Instead of the supplementary rails being outside the ordinary rails, they may, if preferred, be inside them, and a modification of the invention is described in which a supplementary rail having a number of angular faces is placed midway between the ordinary rails, and is acted upon by a grooved drum fixed in the middle of the crank axle. Where sharp curves have to be traversed, the supplementary rail is only used in conjunction with the inner ordinary rail of the curve, the outer ordinary rail being elevated, “so as to allow of “the wheels adapting themselves to the curve.”

The patentee mentions that by this invention the stopping and starting of trains at railway stations may be greatly facilitated.

[Printed, 6d. Drawing.]

A.D. 1865, May 16.—N° 1358. (\* \*)

**MONTGOMERIE, WALTER.**—The principal object of this invention is to obtain increased weight upon the driving wheels of locomotive engines, which is effected by making a portion of the



weight of the tender available for the purpose. In modification the after end of a small tender is an ordinary pair of wheels, and its fore end rests connected to, the contiguous end of the engine by a joint pin, the parts being hinged together to give necessary lateral swinging motion without strain. Various modes of attachment are devised, difficult to detail according to the class of engine to which applied.

- " Locomotive engines may also have ordinary tenders connected to them in the same way, so as to reduce the weight of the tender available on the drive wheels.
- " when it is considered desirable to give a certain capacity to the combined locomotive and tender, the connection may consist of an inclined shut, having a spring connected to the locomotive framing, whilst the tender is connected to a spring or springs within the locomotive.
- " The elasticity of the connection, as well as the weight transferred, will then depend on the position of the connection.
- " modified as may seem desirable by adjusting the position of the connection.

[Printed, 1s. 4d. Drawings.]

## APPENDIX B.

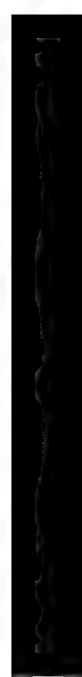
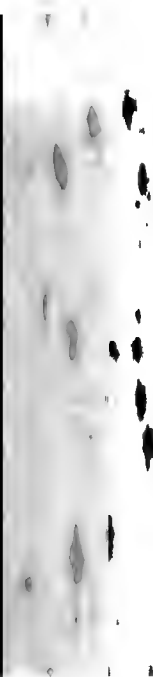
A.D. 1843, February 17.—N° 9635. (\* \*)

BOYDELL, JAMES, junior.—“Improvements in apparatus for retaining the wheels of carriages in the event of an axis breaking or otherwise.”

This invention “relates to certain apparatus combined with the use of such description of axles as run from side to side of the carriages to which they are applied, each axle having two wheels affixed or turning thereon,” the apparatus being “so arranged as to prevent the wheels getting away when any of the axes break, and also prevent the wheels coming off the axes in the event of linch pins or other fastenings coming out.”

An arrangement is described in which certain bars affixed to the framing of a vehicle are provided with forked ends which partially embrace without touching the rims of the wheels, the result of the arrangement being that should an axle break or a linch pin become disengaged, or the wheel become otherwise disconnected from the axle, the bars by resting upon the wheel will sustain the vehicle and prevent it from overturning. The invention is described as being applied to railway carriages as well as to carriages for common roads.

[Printed, 6d. Drawing. See *Repertory of Arts*, vol. 2 (*enlarged series*), p. 270.]



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The names printed in *Italic* are those of the persons by whom the inventions have been communicated to the Applicants for Letters Patent.]

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Sterne, 1350.  
Scott, 1355.  
Michaud, 1364.  
Moulton, 1366.  
Statham and Collins, 1375.  
Whitby, 1380.  
Kochs, 1387.  
Manby, 1403.  
Cooper, 1420.

# Buffers, hydrostatic :

Smith, 79.  
Rayner, 153.  
Lane, 203.  
Wickens, 342.  
Hodge and Spencer, 744.  
White, 810.  
Lamb, 1033.  
Mallet, 424.

# Buffers, pneumatic :

Church, 1430 (*Appendix*).  
Rowley, 47.  
Spinks, 124.  
Melville, 142.  
Walker and Mills, 155.  
Ward and Hiles, 162.  
Holdsworth, 184.  
Adams and Richardson, 197.  
Lane, 303.  
Symons, 204.  
Webster, 210.  
Alliott, 223.  
Beattie, 235.  
Bernard, 271.  
Coleman, 296.  
Garvey, 305.  
Fitzpatrick, 311.  
Fontainemoreau, 364.  
Palmer, 386.  
Hollinsworth, 401.  
Mallet, 424.  
Asbury, 518.  
Gilbee, 803.  
Tenting, 824.  
Fitzpatrick, 898.  
Brooman, 996.  
Lamb, 1033.  
Smith, 1101.  
Gill, 1138.  
Lindner, 1160.  
Hopkins, 1270.  
Williams, 1313.  
Statham and Collins, 1375.  
Cooper, 1420.

# Buffer, sand :

Wilkins, 277.

# Carriages. *See also* Waggon, &c., Axles, Buffers, Springs, Wheels.

Randolph, 1426 (*Appendix*).  
Chapman, W. and E. W., 1427 (*Appendix*).  
De Baader, 2.  
Palmer, 5.  
Snowden, 8.  
Fisher, 10.  
Brandreth, 1428 (*Appendix*).  
Brandling, 11.  
Hill, 12.  
Chapman, 14.  
Dick, 15.  
Church, 1430 (*Appendix*).  
Reedhead, 22.  
Hick, 24.  
Bergin, 25.  
Adams, 1432 (*Appendix*).  
Massey, 39.  
Rothnagle, 39.  
Smith, 43.  
Worsdell, 48.  
Deville, 48.  
Palmer, 50.  
Haddan, 53.

Huffers—*cont.*

- Taylor, 160.  
 Wright, 162.  
 Lee, 129.  
 Sparks, 124.  
 Hall, 125.  
 Dewdney, 129.  
 McGettrick and Tennant, 129.  
 Eyre, 133.  
 Heale, 131.  
 Mayville, 142.  
 Walker and Mills, 133.  
 Fuller, 138.  
 Forsyth, 139.  
 Ward and Hillea, 162.  
 Chesabire, 170.  
 Taylor, 174.  
 Greaves, 176.  
 Holdsworth, 184.  
 Adams, 187.  
 Brockton and Hamrock, 1441  
     *(Appendix)*.  
 Lloyd, 192.  
 De Berque and Haldan, 1443  
     *(Appendix)*.  
 Woods, 1445 *(Appendix)*.  
 Adams and Richardson, 197.  
 Horn, Bradon, and Smith, 199.  
 Lane, 203.  
 Symons, 204.  
 Burch, 207.  
 De Berque, 209.  
 Webster, 210.  
 Chabot, 211.  
 Wighton, 215.  
 De Berque, 216.  
 Allott, 222.  
 Beattie, 235.  
 Thornton and McConnell, 236.  
 Balfour, 238.  
 Knox, 247.  
 Henson, 250.  
 Merchant and Harland, 262.  
 Hanna, 265.  
 Paradis, 264.  
 Fisher, 268.  
 Colgrave, 262.  
 De Berque, 263.  
 Buckwell and Fisher, 263.  
 Sharpe, 266.  
 Melville, 269.  
 Bernard, 271.  
 Rock, 1451 *(Appendix)*.  
 Webster, 1453 *(Appendix)*.  
 Wragge, 276.  
 Lyall, 1454 *(Appendix)*.  
 Wilkins, 277.  
 Adams, 278.  
 Warren, 280.  
 Beattie, 284.  
 Vigurs, 284.  
 Spencer, 289.  
 Coleman, 293.  
 Garvey, 305.  
 Crestadoro, 308.  
 Fitzpatrick, 311.  
 Rock, 312.

# Buffers—*cont.*

Wheeler, 895.  
Wilson, 921.  
Henson, 927.  
Johnson, 945.  
Allan, 947.  
Churchill and Schenley, 948.  
Adie, 957.  
Adams, 957.  
Fowler, 973.  
Wharton, 976.  
Brooman, 986.  
Lloyd, 1001.  
Brooman, 1016.  
Haggett, 1019.  
Lamb, 1033.  
Gibson and Turner, 1067.  
Donovan, 1064.  
Smith, 1101.  
Ulrich, 1110.  
Dyer, 1116.  
Johnston, 1118.  
Gill, 1138.  
Clarkson, 1140.  
Woodward, 1151.  
Price and Donovan, 1151.  
Moir and Serjeant, 1152.  
Chamberlayne, 1154.  
Lindner, 1160.  
Ghislin, 1166.  
Clark, 1177.  
Newton, 1180.  
Livesey and Edwards, 1188.  
Long, 1189.  
Clark, 1194.  
Henson, 1206.  
Simpson, 1217.  
Markham, 1240.  
Rowe, 1244.  
Oliver, 1247.  
Voight, 1256.  
Barbaix, 1265.  
Hopkins, 1270.  
Faure, 1279.  
Williams, 1313.  
Wilson and Hydes, 1323.  
Negretti and Zambra, 1333.  
Spencer, 1341.  
Sterne, 1350.  
Scott, 1355.  
Michaud, 1364.  
Moulton, 1366.  
Statham and Collins, 1375.  
Whitby, 1390.  
Kochs, 1387.  
Manby, 1403.  
Cooper, 1420.

# Buffers, hydrostatic :

Smith, 79.  
Rayner, 153.  
Lane, 203.  
Wickens, 542.  
Hodge and Spencer, 744.  
White, 810.  
Lamb, 1033.  
Mallet, 424.

# Buffers, pneumatic :

Church, 1430 (*Appendix*).  
Rowley, 47.  
Spinks, 124.  
Melville, 142.  
Walker and Mills, 153.  
Ward and Hilles, 162.  
Holdsworth, 184.  
Adams and Richardson, 197.  
Lane, 203.  
Symons, 204.  
Webster, 210.  
Alliott, 223.  
Beattie, 235.  
Bernard, 271.  
Coleman, 298.  
Garvey, 305.  
Fitzpatrick, 311.  
Fontainemoreau, 364.  
Palmer, 385.  
Hollinsworth, 401.  
Mallet, 424.  
Asbury, 518.  
Gilbee, 802.  
Tenting, 824.  
Fitzpatrick, 898.  
Brooman, 986.  
Lamb, 1033.  
Smith, 1101.  
Gill, 1138.  
Lindner, 1160.  
Hopkins, 1270.  
Williams, 1313.  
Statham and Collins, 1375.  
Cooper, 1420.

# Buffer, sand :

Wilkins, 277.

# Carriages. *See also* Waggon, &c., Axles, Buffers, Springs, Wheels.

Randolph, 1426 (*Appendix*).  
Chapman, W. and E. W., 1427 (*Appendix*).  
De Baeder, 2.  
Palmer, 5.  
Snowden, 8.  
Fisher, 10.  
Brandreth, 1428 (*Appendix*).  
Brandling, 11.  
Hill, 12.  
Chapman, 14.  
Dick, 15.  
Church, 1430 (*Appendix*).  
Reedhead, 23.  
Hick, 24.  
Borin, 25.  
Adams, 1432 (*Appendix*).  
Massey, 39.  
Roinagle, 39.  
Smith, 43.  
Worsdell, 48.  
Deville, 48.  
Palmer, 50.  
Haddan, 53.



Carriages, &c.—*cont.*

Wilkison, 57.  
 Deville, 59.  
 Cohen, 60.  
 Parkin, 64.  
 Adams and Buchanan, 66.  
 Kellman, 67.  
 Rangeley, 74.  
 Houldsworth, 81.  
 Pettit, 83.  
 Gall, 100.  
 Tayler, 104.  
 Pape, 112.  
 Benton, 118.  
 Lee, 120.  
 Boydell, 1465 (*Appendix B*).  
 Heale, 141.  
 Wright, 143.  
 Maberly, 151.  
 Bury, 154.  
 Wordsell, 158.  
 Fuller, 158.  
 Powell, 164.  
 Swinburne, 167.  
 Brooman, 169.  
 Etienne, 169.  
 Austin and Quick, 173.  
 Tayler, 174.  
 Graves, 178.  
 Stubbs and Grylla, 177.  
 Brown, 179.  
 Mallet and Dawson, 180.  
 Aitken, 1430 (*Appendix*).  
 Reissner, 182.  
 Henson, 182.  
 Adams, 187.  
 Brockedon and Hancock, 1441  
 (*Appendix*).  
 Pidding, 1442 (*Appendix*).  
 Johnson, 188.  
 De Bergue and Haddan, 1448  
 (*Appendix*).  
 Stratton, 194.  
 Adams, 197.  
 Berger, 201.  
 Hutchinson, 1446 (*Appendix*).  
 Seegers, 219.  
 Knox, 247.  
 Henson, 250.  
 Merchant and Harland, 252.  
 Haddan, 267.  
 Bunnnett, 273.  
 Davies, 1452 (*Appendix*).  
 Haddan, 276.  
 Lyall, 1454 (*Appendix*).  
 Cowper, 280.  
 Pidding, 291.  
 Marcosehan, 1455 (*Appendix*).  
 Mansell, 292.  
 Arnoux, 296.  
 Colson, 299.  
 Lee, 301.  
 Crestadoro, 306.  
 Daft, 307.  
 Rock, 312.  
 Hall, 318.  
 Wilson, 324.

# Carriages, &c.—cont.

Morgan, 914.  
Murray, 914.  
Arrowsmith, 930.  
Marshall, 937.  
Johnson, 945.  
Dunn, 947.  
Adams, 956.  
Adams, 957.  
Gössel, 958.  
La Mothe, 977.  
Bush, 993.  
De Ridder, 991.  
Bush, 1002.  
Grant, 1009.  
Brooman, 1014.  
Johnson, 1016.  
Nethersole, 1024.  
Hasletine, 1033.  
Newton, 1043.  
Clark, 1060.  
Bath, 1071.  
Dudgeon, Meakin, and Allen, 1078.  
Bray, 1082.  
Samuel, 1084.  
Bielefeld, 1089.  
Leprovoat, 1090.  
Henson, 1092.  
Bourlique and Vidard, 1097.  
Dobbie, 1109.  
Ulrich, 1110.  
Eldon, 1112.  
Von Kanig, 1113.  
Dyer, 1116.  
Johnston, 1119.  
Saunders, 1134.  
Grafton, 1141.  
Moir and Serjeant, 1152.  
Chamberlayne, 1154.  
Howarth, 1155.  
West, 1171.  
Wilson, 1181.  
Claxton, 1185.  
Tucker, 1186.  
Wilson, 1186.  
Lansdown, 1188.  
Cotton, 1195.  
Curtis, 1199.  
Ward, 1199.  
Clark, 1207.  
Watkins, 1209.  
Meulemans, 1210.  
Adams, 1218.  
Shaw, 1222.  
Holly, 1225.  
Wood, 1226.  
Salmon, 1233.  
Chidley, 1237.  
Adams, 1242.  
James, 1243.  
Kernot and Symons, 1256.  
Mackenzie, 1252.  
Thompson and Green, 1253.  
Stephenson and Phipps, 1256.  
Morgan, E. and G. H., 1258.  
Riddell, 1259.

# Carriages, &c.—cont.

Defries, 1273.  
Smith, 1274.  
Rigg, 1282.  
Petitjean and McNally, 1283.  
Stephens, 1293.  
Hazeldine, 1296.  
Woodbury, 1305.  
Aitken, 1307.  
Johnson, 1308.  
Kernot and Symons, 1311.  
Craig, 1314.  
Henry, 1315.  
Sims and Burns, 1324.  
Loubat, 1323.  
Negretti and Zambra, 1333.  
Defries, 1351.  
Clark, 1354.  
Rock, 1359.  
Holliss, 1363.  
Macneile, 1364.  
Baker, 1385.  
Kochs, 1387.  
Wappenstein, 1392.  
Fell, 1393.  
Daniell, 1401.  
Brooman, 1420.  
Murphy, 1421.

# Carriages, blinds for. *See also* Carriages.

Jenner, 1139.  
Scott, 1355.

# Carriages for cattle. *See also* Carriages.

Cannon, 318.

# Carriages for central rail. *See also* Carriages.

Bruff, 294.

# Carriages, doors, &c. for. *See also* Carriages, framing for Carriages, Fastenings for carriages, &c.

Oxley, 732.  
Panahawe and Jaques, 979.  
Applegate, 1061.

# Carriage doors and windows, fastenings for. *See also* Carriages.

Johnson, 605.  
Train, 893.  
Panahawe and Jaques, 979.  
Wilson, 1186.  
Farrell, 1191.  
Milligan, 1193.  
Shaw, 1222.  
Holly, 1225.  
Wood, 1226.  
Defries, 1243.

**Carriage doors, &c.—cont.**

Howarth, 1207.  
 Simpson, 1310.  
 Shaw, 1350.  
 DeFrans, 1351.  
 Gedgo, 1375.

**Carriage doors, hinges for. See also Carriages.**

Fisher, 258.  
 Maberly, 631.  
 Oxley, 752.

**Carriage door shields:**

Norton, 703.

**Carriages for elevated rails. See also Carriages and Waggon.**

Palmer, 6.  
 Fisher, 10.  
 Dick, 15.  
 James, 121.  
 Newton, 194.  
 James, 1218.  
 Wappenstein, 1392.

**Carriages and locomotives, &c., framing for. See also Carriages and Waggon.**

Chapman, W. and E. W., 1427  
*(Appendix)*.  
 Fisher, 10.  
 Brandreth, 1422 *(Appendix)*.  
 Church, 1430 *(Appendix)*.  
 Berget, 25.  
 Massey, 30.  
 Reinagle, 30.  
 Curtis, 53.  
 Huddan, 53.  
 Kollman, 67.  
 Pettit, 83.  
 Pope, 112.  
 Ralli, 125.  
 Bodmer, 131.  
 Fyre, 135.  
 Beale, 141.  
 Wright, 143.  
 Maberly, 151.  
 Forsyth, 159.  
 Crawford, 160.  
 Etienne, 160.  
 Taylor, 174.  
 Groves, 176.  
 Mallet and Dawson, 180.  
 Aitken, 1439 *(Appendix)*.  
 Bessemer, 182.  
 Henson, 182.  
 Johnson, 188.  
 De Berrue and Haddan, 1443  
*(Appendix)*.  
 Berger, 201.  
 Symons, 204.  
 Pearson, 213.

**Carriages, &c.—cont.**

Seebers, 219.  
 Knox, 247.  
 Sharpen, 265.  
 Haddan, 267.  
 Lyall, 1454 *(Appendix)*.  
 McDonnell, 282.  
 Ashbury, 332.  
 De Berrue, 343.  
 Davis, 362.  
 Smith, 387.  
 Harris, 419, 433.  
 La Motte, 434.  
 Aerts, 447.  
 Dechant and Sisco, 469.  
 Hazeldine, 493.  
 Clewe, 497.  
 Clay, 513.  
 Green, 567.  
 Newton, 620.  
 Clay, 698.  
 D'Hello and De Wareque, 699.  
 Bussi, 710.  
 Lins, 735.  
 Munn, 753.  
 Hudley, 760.  
 Johnson, 773.  
 Russell, 774.  
 Fournier, 787.  
 Aimont, 795.  
 Gregory, 817.  
 Wilson, 850.  
 Greenwood and Batley, 852.  
 Effertz, 860.  
 Train, 893.  
 Newton, 900.  
 Pickstone, 909.  
 Dunn, 947.  
 Adams, 950.  
 La Motte, 977.  
 De Ridder, 997.  
 Bush, 1002.  
 Henson, 1092.  
 Bourmaque and Vidard, 1099.  
 Atcock, 1107.  
 Dobbie, 1109.  
 Elsdon, 1112.  
 Dyer, 1114.  
 Adams, 1133.  
 Fletcher, 1148.  
 Tisdale, 1161.  
 Farlie, 1170.  
 Wilson, 1181.  
 Adams, 1218.  
 Hazeldine, 1268.  
 Montgomerie, 1263.  
 Hazeldine, 1296.  
 Woodbury, 1305.  
 Kernot and Symons, 1311.  
 Fowler, 1355.  
 Murphy, 1421.

**Carriages, furniture for:**

Holden, 812.  
 Draper, 876.

## Carriages, gasometer for :

Thompson, 649.

## Carriages, guards for :

Wright, 809.

## Carriages, handles for :

Howes and Burley, 1231, 1272.

## Carriages, letters and numerals for :

Glover, 900.

## Carriages, lighting. *See also* Carriages.

Curtis, 614.

Prentiss, 833.

Watkins, 1209.

Howes and Burley, 1231.

Howarth, 1267.

Howes and Burley, 1272.

Shaw, 1350.

Clark, 1354.

Scott, 1355.

## Carriage for liquids :

Hall, 312.

## Carriage, mail :

Wordsell, 43.

## Carriages, material for (corrugated) :

Haggett, 793.

Bielefeld, 1089.

Kirrage, 1095.

## Carriages, moving and stopping :

Foot, 546.

Burt, 787.

Guerrero, 901.

Johnson, 1223.

## Carriages for maritime railway :

Newton, 950.

## Carriages for parcels :

Marcescheau, 1455.

## Carriages for portable railway :

Grant, 1009.

## Carriages, seats for. *See also* Carriages.

Mears and Houlton, 667.

Reilly, 794.

Cottam, 767.

Cornish, 905.

Luis, 909.

Needham, 910.

## Carriages, seats for—*cont.*

Johnson, 912.

Fournier, 1038.

Dwyer, 1079.

Salmon, 1223.

Geering, 1290.

Clairmonte, 1393.

## Carriages for single rail :

Palmer, 5.

Fisher, 10.

## Carriages, steps for. *See also* Carriages.

Bodmer, 181.

Offord, 1020.

Curtis, 1199.

Ward, 1199.

Meulemans, 1310.

Howarth, 1267.

Petitjean and McNally, 1283.

Howarth, 1350.

Scott, 1355.

## Carriages, stopping runaway :

Templeton, 171.

## Carriages and engines, &c., suspending. *See also* Car- riages and Framing for car- riages.

Griffith, 6.

Applegarth, 32.

Bergin, 30.

Dundonald, 34.

Reinagle, 32.

Haddan, 53.

Adams and Buchanan, 66.

Kollman, 67.

Pettit, 83.

Condie, 39.

Adams, 97.

Wright, 143.

Greenhow, 168.

Mallet and Dawson, 199.

De Bergue and Haddan, 1443

(*Appendix*).

Berger, 201.

Fuller, 463.

Hazeldine, 493.

Aimont, 795.

Ulrich, 1110.

Clark, 1207.

Henry, 1315.

Longridge, 1335.

## Carriages for suspended rail :

Westley, 433.

Haddan, 677.

## Carriages for timber. *See also* Waggons.

Horne, Beadon, and Smith, 199.

Murphy, 337.

Aerts, 726.

**Carriages, transporting :**

Ellis, 267.

**Carriages, umbrella stand for :**

Gilks, 621.

**Carriages, ventilating. See also****Carriages.**

Blake, 242.

Knox, 247.

Hepburn, 279.

Poole, 294.

Curtis, 614.

Wheelhouse and Greenwood

667.

Hadley, 700.

Gregory, 834.

Newton, 854.

Johnson, 912.

Minchin, 982.

Wagzell, 945.

Haseltine, 1033.

Flexen, 1048.

Hilliar, 1063.

Flexen, 1120.

Chidley, 1237.

**Carriage, warming. See also****Carriages.**

Adams, 107.

Guyot, 604.

Salmon, 816.

McConnell, 1002.

Davies, 1214.

Chidley, 1237.

Howarth, 1330.

**Carriages, windows for. See****also Carriages.**

Britten, 227.

Heywood, 274.

Oxley, 732.

Luis, 735.

Train, 803.

Smellie, 905.

Arrowsmith, 929.

La Mothe, 977.

Minchin, 982.

Flexen, 1048.

Hilliar, 1063.

Fraser, 1093.

Holbrook, 1150.

Watkins, 1209.

Farnworth, 1277.

Wrigley and Westhead, 1298.

Pennington, 1303.

Farnworth, 1322.

Scott, 1355.

Elliott, 1377.

Price, 1400.

**Carriages without wheels :**

Daniells, 1401.

Pidding, 1442.

# Coupling and uncoupling carriages—cont.

Lowe and Simpson, 190.  
 Newton, 194.  
 Poole, 196.  
 Symons, 204.  
 Chabot, 211.  
 Wrighton, 215.  
 McConochie and Claude, 219.  
 Pratt, 223.  
 Thornton and McConnell, 236.  
 Whitworth, 245.  
 Parsons, 246.  
 Knox, 247.  
 Merchant and Harland, 252.  
 Colegrave, 263.  
 Newton, 265.  
 Melville, 269.  
 Adams, 278.  
 Beattie, 284.  
 Coleman, 298.  
 Eiler, 302.  
 Crestadoro, 303.  
 Jones, 330.  
 Asbury, 332.  
 Miles, 335.  
 Murphy, 337.  
 Merritt, 338.  
 Wigglesworth, 356, 360.  
 Essie, 409.  
 Newall, 410.  
 Firth, 415.  
 Barnetche, 427.  
 Blake, 440.  
 Essie, 448.  
 Rowland, E. & J., 460.  
 Cranstoun, 473.  
 Roberts, 487.  
 Gedge, 491.  
 Ingall, 511.  
 Chattaway, 519.  
 Flynn, 530.  
 Haley, 541.  
 Sharp and Forsyth, 568.  
 Newton, 573.  
 Whitgreave, 575.  
 Flint, 577.  
 Demain, 579.  
 Russell, 596.  
 Taylor, 1462 (*Appendix*).  
 Hardstaff, 642.  
 Evans, 653.  
 Roy, 665.  
 Brooman, 669.  
 Mortera, 672.  
 Kelshaw and Wilkinson, 684.  
 Williams, 696.  
 Rodgett, S. and D., 702.  
 Nethersole, 719.  
 Kaye, 721.  
 Westhead and Baines, 733.  
 Osborne and Bell, 734.  
 Stocks and Kaye, 737.  
 Wrigley, 769.  
 Corfield, 783.  
 Wells and Clough, 784.  
 Tourrier, 787.

# Coupling and uncoupling carriages—cont.

Cloake, 792.  
 Palmer, 794.  
 Bouch, 815.  
 Frion, 818.  
 Vandecasteele, 833.  
 Osborne, 844.  
 Simpkin, 847.  
 Cooper, 870.  
 Davies, 872.  
 Henson, 877.  
 Bodmer, 898.  
 Walmsley and Rostron, 912.  
 Baker, 923.  
 McDonall, 931.  
 Churchill and Schenley, 943.  
 Adams, 957.  
 Beestell, 968.  
 Birkbeck, 990.  
 Beestell, 1004.  
 Thompson, S. K. and A. T., and Mawson, 1007.  
 Nethersole, 1024.  
 De Berville, 1025.  
 Henry, 1072.  
 Newton, 1074.  
 Brooman, 1099.  
 Smith, 1101.  
 Ulrich, 1110.  
 Bell, 1116.  
 Kirkman, 1129.  
 Fletcher, 1149.  
 Moir and Serjeant, 1152.  
 Chamberlayne, 1154, 1163.  
 Balans, 1190.  
 Newton, 1190.  
 Lawson, 1187.  
 Clark, 1197.  
 Chatterton, 1201.  
 Robertson, 1233.  
 Markham, 1240.  
 Donald, 1245.  
 Morris, D., and J., and J., 1246.  
 Dadley, 1257.  
 Montgomerie, 1463.  
 Smith and Brook, 1291.  
 Morgan, 1293.  
 Robinson, 1296.  
 Ward, 1300.  
 Freeman and Grundy, 1301.  
 Wilson and Hyde, 1323.  
 Morgan, 1363.  
 Brewer, 1382.  
 Johnson, 1403.  
 Butler and Dalgety, 1417.  
 Lake, 1423.

# Crane travelling :

Taylor, 857.

Curves, facilitating passage of.  
*See* Axles, Axle Boxes, Carriages, &c.



**Drag staff :**

Adams, 97.

**Draw bars.** See **Buffer  
Brakes, Carriages, Coupling  
Carriages, Springs, &c.****Draw springs.** See **Springs.****Dust, laying the :**

Meulemans, 1310.

**Elevators :**

Brandling, 11.

**Equalizing load on wheels :**

Chapman, 14.

**Fastenings for doors and win  
dows :**Johnson, 605.  
Train, 393.  
Faulstich and Jaques, 979.  
Wilson, 1186.  
Farrell, 1191.  
Milligan, 1193.  
Shaw, 1222.  
Holly, 1226.  
Wood, 1226.  
Defries, 1243.  
Howarth, 1267.  
Simpson, 1310.  
Shaw, 1350.  
Defries, 1351.  
Gedge, 1373.**Fastening or spring catch :**

Weston, 1075.

**Fastening for sashes, windows  
&c. See also Carriage, win  
dows for.**Fraser, 1093.  
Farnworth, 1277.  
Wrisley and Westhead, 1298.  
Farnworth, 1322.  
Scott, 1355.  
Elliott, 1377.  
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| <p> <b>Aberystwith</b> (<i>Literary and Working Men's Reading Room</i>).<br/> <b>Alnwick</b> (<i>Scientific and Mechanical Institution</i>).<br/> <b>Altrincham</b> (<i>Altrincham and Bowdon Literary Institution</i>).<br/> <b>Ashby-de-la-Zouch</b> (<i>Mutual Improvement Society</i>).<br/> <b>Bacup</b> (<i>Mechanics' Institution</i>).<br/> <b>Ballymoney</b> (<i>Town Hall</i>).<br/> <b>Banbridge</b> (<i>Literary and Mutual Improvement Society</i>).<br/> <b>Banbury</b> (<i>Mechanics' Institution</i>).<br/> <b>Barnstaple</b> (<i>Literary and Scientific Institution</i>).<br/> <b>Bath</b> (<i>Athenaeum</i>).<br/> <b>Batley</b> (<i>Mechanics' Institution</i>).<br/> <b>Battle</b> (<i>Young Men's Christian Association</i>).<br/> <b>Belfast</b> (<i>Athenaeum</i>).<br/> <b>Berkhamstead, Great</b> (<i>Working Men's College</i>).<br/> <b>Birmingham</b> (<i>Birmingham Heath and Smethwick Working Men's Club and Institute</i>).<br/>         — (<i>Bloomsbury Institution</i>).<br/>         — (<i>Central Lending Library</i>).<br/>         — (<i>Darvill and Working Men's Association</i>).         </p> | <p> <b>Birmingham</b> (<i>Graham Street Institution</i>).<br/> <b>Bodmin</b> (<i>Literary Institution</i>).<br/> <b>Bolton</b> (<i>Mechanics' Institute</i>).<br/>         — (<i>School of Art</i>).<br/> <b>Bradford, near Manchester</b> (<i>Bradford Working Men's Club</i>).<br/>         —, <b>Yorkshire</b> (<i>Library and Literary Society</i>).<br/>         — (<i>Mechanics' Institute</i>).<br/> <b>Brampton, near Chesterfield</b> (<i>Leam Museum and Literary Institute</i>).<br/> <b>Breage, Cornwall</b> (<i>Breage Institution</i>).<br/> <b>Bristol</b> (<i>Athenaeum</i>).<br/>         — (<i>Institution</i>).<br/>         — (<i>Law Library Society</i>).<br/>         — (<i>Library</i>).<br/> <b>Brooms Grove</b> (<i>Literary and Mechanics' Institute</i>).<br/> <b>Burnley</b> (<i>Mechanics' Institution</i>).<br/>         — (<i>Literary Institution</i>).<br/> <b>Burslem</b> (<i>Wedgewood Institution</i>).<br/> <b>Bury St. Edmund's</b> (<i>Mechanics' Institution</i>).<br/> <b>Canterbury</b> (<i>Working Men's Club</i>).<br/> <b>Cardiff</b> (<i>Free Library and Museum</i>).<br/> <b>Cardigan</b> (<i>Mechanics' Institute</i>).<br/> <b>Carharrack</b> (<i>Literary Institute</i>).         </p> |
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Cockermouth (Mechanics' Association).  
 Colchester (Literary Institute) (Young Men's Association).  
 Compsall (Athenaeum).  
 Coventry (Free Library).  
 — (Institute).  
 — (School of Art).  
 Crediton (Working Men's Society).  
 Dartmouth (Mutual Improvement Society).  
 Deal (Deal and Walmer Mechanics' Institution).  
 Denton (Denton and Huddersfield Mechanics' Institution).  
 Derby (Mechanics' Institute).  
 Devonport (Mechanics' Institute).  
 Dewsbury (Mechanics' Institute).  
 Doncaster (Free Library).  
 — (Great North Street Institute).  
 Dorchester (County Library).  
 — (Working Men's Library).  
 Dudley (Mechanics' Institute).  
 Dukinfield (Mechanics' Institute).  
 — (Village Reading Room).  
 Dumbarton (Philosophical Society).  
 Dumfries (Mechanics' Institute).  
 Durham (Mechanics' Institute).  
 Easing, Bolton-le-Moors (Mechanics' Institute).  
 Earlestown, Newton-le-Phos (Mechanics' Institute).  
 Edinburgh (Horological Society).  
 — (Mechanics' Institute).  
 — (Philosophical Society).  
 — (Royal Society).  
 — (Royal Society of Arts).

Liverpool (Institute).  
 — (Mechanics' Institute).  
 — (Medical Institution).  
 — (Polytechnic Society).  
 Llanelly (Chamber of Commerce and Reading Room).  
 London (Athenæum Club, Pall Mall).  
 — (Beaumont Institute, Mile End).  
 — (Boxford Working Men's Institute, Spitalfields).  
 — (Birkbeck Institution, Southampton Buildings, Chancery Lane).  
 — (Bow Common Working Men's Club, Devon's Road, Bow Common).  
 — (Christchurch Working Men's Club, New Street, Lark Hall Lane, Clapham).  
 — (Clerkenwell Club, Lower Rosoman Street).  
 — (Holloway Working Men's Club and Institute, Holloway Road).  
 — (Literary and Scientific Society, Wellington Street, Islington).  
 — (Literary and Scientific Institution, Walworth).  
 — (St. James and Soho Working Men's Club, Rupert Street, Soho).  
 — (St. Mary Charterhouse Working Men's Club, Golden Lane).  
 — (South London Working Men's College, Blackfriars Road).  
 — (Southwark Working Men's Club, Broadwall, Stamford Street).  
 — (Spring Vale Institution, Hammermith).  
 — (Working Men's Club, Briston Hill).  
 — (Working Men's Club, St. Mark's, Victoria Docks).  
 — (Working Men's Club and Institute Union, Strand).  
 — (Working Men's Club and Institute, Battersea).  
 — (Working Men's College, Great Ormond Street).  
 Loughborough (Working Men's Club and Institute).  
 Madeley (Anstice Memorial, Workmen's Club and Institute).  
 Manchester (Athenæum).  
 — (Law Library).  
 — (Mechanics' Institution).  
 — (Natural History Museum, Peter Street).  
 — (Portico Library, Mosley Street).  
 — (Royal Exchange Library).  
 Mansfield (Co-operative Industrial Society).  
 — (Mechanics', Artisans', and Apprentices' Library).  
 Melksham (Mutual Improvement Society).  
 Merthyr-Tydfil (South Wales Institute of Engineers).  
 Middlesbrough (Mechanics' Institution).  
 Modbury (Mechanics' Institution).

Mowley (Mechanics' Institute).  
 Newark (Mechanics' Institute).  
 Newcastle-upon-Tyne (Mechanics' Institution).  
 — (Working Men's Club).  
 New Mills, near Stockport (Mechanics' Institute).  
 Newport, Isle of Wight (Young Men's Society and Reading Room).  
 Northampton (Mechanics' Institute).  
 Nottingham (Free Library).  
 — (Mechanics' Institution).  
 — (Subscription Library, Bromley House).  
 Oldham (Analytic Literary Institution).  
 — (Mechanics' Institution, Werneth).  
 Ormakirk (Public Library).  
 Oswestry (Institute).  
 Patricroft (Mechanics' Institution).  
 Pembroke Dock (Mechanics' Institute).  
 Pendleton (Mechanics' Institution).  
 Penryn (Working Men's Club and Reading Room).  
 Perth (Mechanics' Library, High Street).  
 Peterborough (Mechanics' Institution).  
 Plymouth (Working Men's Institute).  
 Poole (Literary and Scientific Institution).  
 — (Mechanics' Institute).  
 Portsea (Athenæum and Mechanics' Institution).  
 Preston (Avenham Institution).  
 — (Society of Useful Knowledge).  
 Rawtenstall (Mechanics' Institution).  
 Richmond (Working Men's College).  
 Rotherham (Rotherham and Masbro' Literary and Mechanics' Institute).  
 Royston (Institute).  
 Ryde, Isle of Wight (Philosophical and Scientific Society).  
 Saffron Walden (Literary and Scientific Institution).  
 St. Just (Institution).  
 St. Leonard's (Mechanics' Institution).  
 Salford (Working Men's Club).  
 Salthaire (Literary Institute).  
 Selby (Mechanics' Institute).  
 Sheffield (Branch Free Library).  
 — (Literary and Philosophical Society, School of Arts).  
 Skipton, Yorkshire (Mechanics' Institute).  
 Southampton (Hartley Institution).  
 — (Polytechnic Institution).  
 Southport (Athenæum).  
 South Shields (Working Men's Institute and Club).  
 Spalding (Mechanics' Institute).  
 — (Christian Young Men's Association).  
 Staines (Literary and Scientific Institution).  
 — (Mechanics' Institute and Reading Room).  
 Stamford (Institution).



Tadmorden (Mechanics' Institution).  
 Truro (Cornwall County Library).  
 — (Institution).  
 — (Royal Institution of Cornwall).  
 Tumbidge Wells (Mechanics' Institution).  
 — (Society of Literature and Science).  
 Turlon near Bolton (Chapel of the Institute).  
 Twickenham (Economic Museum).  
 Ulverston (Temperance Hall).

Presentations of portions of  
 Commissioners of Patents  
 Libraries:—

Arranagh (Town Clerk's Office).  
 Aylesbury (Mechanics' Institution).  
 — (Library Society, Kingsbury).  
 Birmingham (Institution of Mechanical Engineers, Newhall Street).  
 Boston, Lincolnshire (Public Office, Market Place).  
 Cambridge (Free Library, Jesus Lane).  
 Chester (Mechanics' Institute, John Street).  
 Coalbrookdale (Literary and Scientific Institution).  
 Coventry (Watchmakers' Association).  
 Darwen, Over (Free Library).  
 Dublin (Dublin Library, D'Almeida Street).  
 Edinburgh (Horological Society).  
 Exeter (Public Library).  
 — (Exeter Women's Institute).

*British Colonies and Foreign States.*

British Columbia—Mechanics' Institute, Victoria.

—Public Library, New Westminster.

France—Academy of Science, Paris.

Netherlands—Bibliothèque de l'Ecole Polytechnique de Delft.

Russia—Imperial Technological Institute, St. Petersburg.

Smyrna—Literary and Scientific Institute.

United States—American Academy of Arts and Sciences, Boston.

—American Institute, New York.

—American Society of Civil Engineers, New York.

Odd Fellows' Library Association, San Francisco.

—Smithsonian Institute, Washington.

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## PATENT OFFICE MUSEUM, SOUTH KENSINGTON.

THIS Museum is open to the public daily, free of charge. The hours of admission are as follows :—

Mondays, Tuesdays, and Saturdays, 10 A.M. till 10 P.M.

Wednesdays, Thursdays, and Fridays, from 10 A.M. till 4, 5, or 6 P.M., according to the season.

If any Patentee should be desirous of exhibiting a model of his invention in London, he may avail himself of this Museum, which has been visited since its opening on the 22nd June 1857 by more than 2,000,000 persons. The model will be received either as a gift or loan ; if deposited as a loan, it will be returned on demand. Before sending a model, it is requested that the size and description of it shall first be given to the Superintendent of the Patent Office Museum.

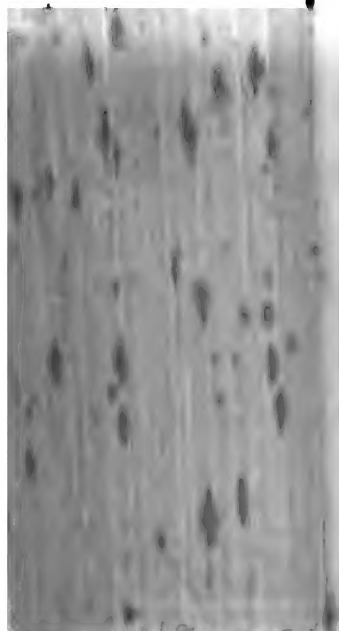
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GALLERY OF PORTRAITS OF INVENTORS, DISCOVERERS, AND INTRODUCERS OF USEFUL ARTS.—This Collection, formed by Mr. Woodcroft, and first opened to public view in 1853, is now exhibited in the Patent Office.

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All communications relating to the Patent Office, or to the Museum and Portrait Gallery, to be addressed to B. WOODCROFT, Clerk to the Commissioners of Patents and Superintendent of the Patent Office Museum, at the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.





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